DECEMBER, 1942

Industrial FINISHING

Published Monthly in the Interest of Modern Production Finishing

TECHNOLOGY DEPT.

LARGEST SPRAY BOOTH EVER BUILT

In this gigantic 3-level ventilating system—a multiple assembly of Mahon Hydro-Filter Units combined with a Mahon Filtered Air Supply system—two completely assembled bombers may be spray painted at once. The system cleans the vast enclosure of dangerous overspray and continually floods the entire space with an equalized flow of heated, washed and filtered air. Enclosure is 150' wide, 200' long and 35' high, the largest system for the purpose ever built.

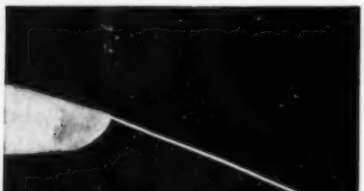
THE R.C. MAHON COMPANY • DETROIT • CHICAGO

See story on Page 28, November, 1942 issue of INDUSTRIAL FINISHING.

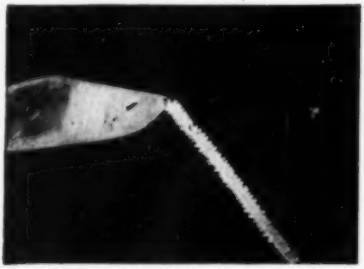
3 MORE SIMILAR INSTALLATIONS ARE NOW BUILT OR BEING BUILT

MAHON

ADHESION!



Baflex-A film when cut through shows firm adhesion at the edges.



Note shattering of film of average primer indicating poor adhesion.

NEW FINISH CLINGS TO STEEL, BRASS, ALUMINUM, CADMIUM, TERNEPLATE, STAINLESS STEEL, ZINC, AND EVEN POLISHED CHROMIUM

THE facts about Roxalin's new Baflex-A, which can be used interchangeably as a primer for these hard-to-finish metals, or as a one coat finish in itself, are as follows:

1 — Sprays, dips, tumbles, or roller coats.
2 — Air dries to recoat in ten minutes.
3 — Permits a bake of 350° F., if desired.
4 — It provides a perfect bond with lacquers or synthetics.
5 — Flexible enough to permit fabrication.
6 — Has excellent resistance to: Aviation Gasoline, Benzol, Salt Spray, Humidity, Water Immersion, Outdoor Exposure.
7 — Made in clear and black.

The outstanding adhesion insured by Baflex-A makes it invaluable to war contractors to whom it is available on priority. Where ordinary finishes have failed, Baflex-A has helped manufacturers of aircraft parts, radio apparatus, and electrical equipment to eliminate rejects due to poor adhesion.

For complete factual information, write us about your specific problem.

ROXALIN *Flexible* FINISHES
INCORPORATED
ELIZABETH • NEW JERSEY
Box 122

"WHERE THE FINISH COUNTS USE ROXALIN"

GUNS and TANKS
THAT FIGHT AT HOME

Paasche WEAPONS OF INDUSTRY SPEED
FINISHING OF WEAPONS FOR WAR

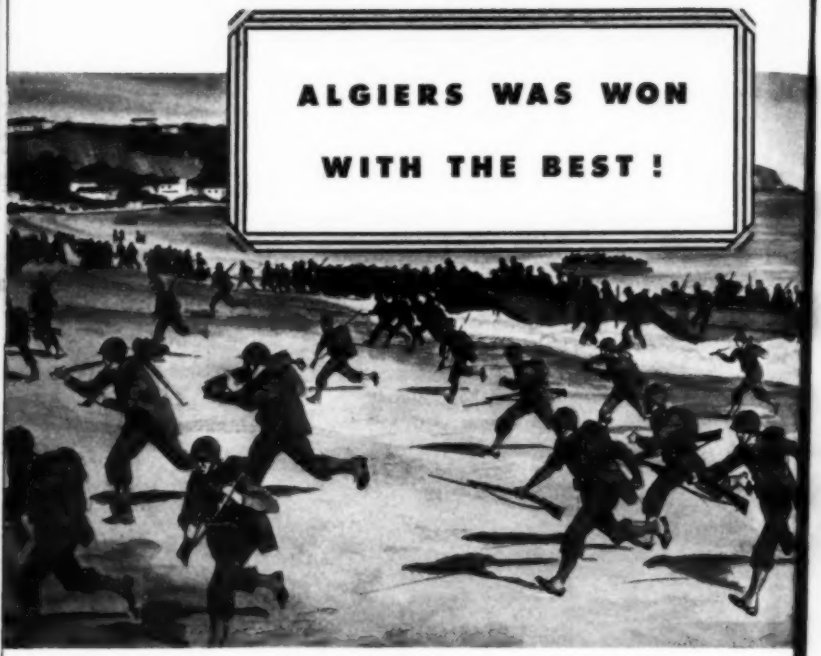
To win the battle of production, every minute must be made to count. Are you doing it? Have you taken full advantage of the valuable time and labor saving features that Paasche Products offer? Your weapons are the guns and tanks and other equipment that makes your finishing department. Put Paasche Equipment to work and you can increase efficiency, improve quality, and step up production. You arm yourself with equipment that's tailor made for war.

Easier to Handle" that's what finishing en say about the Paasche C.U.B. High roduction Airbrush. It s 22 ounces of rfectly balanced weight nestles in the nd—and enables operator to work at ghest efficiency for long hours. That tinctive design means fewer replace- ents—Operators like the simple con- uction—that means easier cleaning. nd in operation—it sprays all types of ishing material at top speed under per- ct control. This is the gun for you.

5 SECONDS AND THE COVER'S OFF
Raise the lever—slip out—and you can remove the Clamptight Cover of this Paasche Pressure Feed Material Tank. No knuckle busting wrenches are needed, nothing to lose. Cover assembly equipped with new pressure locking regulator. Here's another Paasche Time Saver that you need.

SEND FOR BULLETIN FM-9-42

Paasche Airbrush Co. 1917 DIVERSEY PARKWAY CHICAGO ILLINOIS



Ultra modern, tremendously effective equipment was in the hands of our fighting forces when they swept through the North African surf. For in this war, our men are not sent into battle until their weapons are as good as or superior to those of their enemies. And that goes for *finishes,* too.

For—all that fire-breathing power would be useless if rust and corrosion were allowed to attack it. *Finishes*, therefore, must be right.

In making sure that shells *fire* in a critical moment, in protecting surfaces against hidden enemies, moisture, salt water, heat, cold, abuse anywhere on earth, finishes cannot fail.

That is why Zapon finishes for implements of war—and we're working night and day producing them—must meet or exceed government specifications. They do.

ZAPON

ZAPON DIVISION · ATLAS POWDER COMPANY

Eastern Sales: Stamford, Conn. Western Sales: North Chicago, Ill.

INDUSTRIAL FINISHES

NINETEENTH YEAR OF PUBLICATION

Industrial FINISHING

Reg. U. S. Pat. Office

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Eastern Representative: C. A. Larson, 254 West 31st Street, New York City; Phone Penna. 6-9049

Letters from Readers...

OF INDUSTRIAL FINISHING

These letters (and many others) were answered recently by the editorial department, but are published here to reveal certain interesting trends of desire and activity in the industry, and to encourage additional inquiries, comments and suggestions. Further information about any of them can be obtained by writing this office.—Editor.

Indicates How Much in Drum

On page 22 of Sept. 1942 issue of INDUSTRIAL FINISHING, there is an article in regard to an indicator for attaching to the faucet opening of a standard 55-gallon steel drum. We would appreciate literature on this article, or the name and address of the company from which this information can be obtained.—A. E.

It is a product of Pack-Rite Machine Corp., 828 N. Broadway, Milwaukee, Wisc.—ED.

Infra-Red Paints

If available, we would like to secure two reprints of the article entitled "Infra-Red Reflectance of Paints", by Paul O. Blackmore, published in September, 1942, issue of INDUSTRIAL FINISHING Magazine.—M. C. Co. (Lacquer Research Div.).

Hot Lacquer Outfit

Several years ago we remember of seeing in INDUSTRIAL FINISHING details of a hot-lacquering outfit which was self-contained.

There are two or three comparatively inefficient outfits on the market, the one that we purchased by chasing up the only ad we could find, being an electrically-heated pot type made by _____ which is quite unsatisfactory.

We believe that if we were to combine the electrically-heated nozzle with the electrically-heated pot we would have a testing equipment which would be good.

Our library of INDUSTRIAL FINISHING magazines is fairly complete, back to July, 1930, but there are gaps. We feel sure the article or advertisement is not in one of our copies. Can you help us through your admirable filing system?—T. N.

Information furnished.—ED.

Tumbling Barrels

We would appreciate your forwarding us any available information relative to the manufacturers of tumbling barrels for wood parts, and the finishing thereof, especially beads and buttons.—A. P. Co.

Tack Rags

Where can we purchase Magic or other tack rags?—R. Mfg. Co.

Magic tack rags are products of Wm. A. Juergens Co., 4036 LaGrange St., Toledo, Ohio.—ED.

An Author's Address

We are compiling our annual author index to Chemical Abstracts. We have published an abstract of the paper, "Finishing Plywood Aircraft" by H. C. Lewis. This paper appeared in your Journal in volume 13, No. 3, pages 30, 32 and 34 for 1942. Could you furnish us with Mr. H. C. Lewis' address in order that we can write him

DOLAN WAR FINISHES

for WOOD and METAL

Olive Drabs ★ **Rot Inhibiting Primers**

Lustreless Enamels **Battleship Grays**

Shell Lacquers ★ **Airplane Dopes**

If you are figuring on Government contracts with the Army, Navy, Air Corps or any branch of service—we are equipped to furnish the finishes according to Government specifications. Our staff of Laboratory Technicians is familiar with all problems and its services are available for the asking.

Also Still Available

DU-BAR BLEACH ★ **FABRI-CLEAN**

For modern light-tones **The magic Fabric Cleaner**

V. J. DOLAN & COMPANY, INC.

Mfrs. of "Unquestionable Quality" Industrial Finishes

1830 N. LARAMIE AVENUE CHICAGO, ILLINOIS

LOOK! next month for Sterling's

NEW SANDER

Outstanding Development in Its Field.
Speeds War Production.

STERLING TOOL PRODUCTS CO.
365 East Ohio Street • Chicago, Ill.

SPECIFICATION PROTECTIVE COATINGS

UNITED'S Specification Protective Coatings are doing their part to help keep war production schedules rolling.

There is a specially formulated United product to meet the rigid requirements of any Government specification protective coating. Years of constant research and product development have enabled us to meet the unusual requirements and demands of war work.

Call on United for Government Specification Coatings and let us help you solve your finishing production problems and "Keep 'Em Rolling."

United's S. P. Coatings are now used on shells, ammunition boxes, ammunition, army trucks, signal corps equipment, instruments and panels, airplane parts, portable machine shops, etc.

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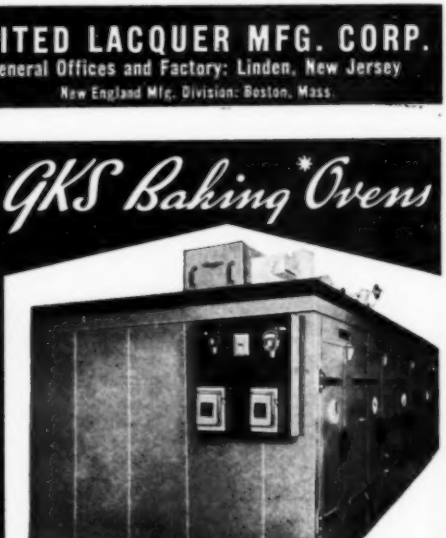
General Offices and Factory: Linden, New Jersey
New England Mfg. Division: Boston, Mass.

STANDARD SIZES FOR PROMPT DELIVERY

GKS Baking Ovens



GKS Ovens will give you efficient, uniform baking at war production speeds. Standard units can be assembled to handle any size job. Phone, wire or write for information.

GEORGE KOCH SONS, INC. Evansville, Ind.

for his full name? We are anxious to index all author names correctly and will appreciate this help from you.—Chemical Abstracts, The Ohio State University.

Information supplied.—ED.

Luminous Paints

Am interested in the article, "Luminous Paints", as published in 1942 October issue. I have hunted through the buying guides and looked in every source that I could think of and have not been able to find the address of "American Luminous Products Co." They must be very new. Maybe they don't advertise. I was thinking of trying out some signs for night use. Can you tell me where I can get some of the product that would be suitable for plywood?—E. E. H.

American Luminous Products Co. is located at 6420 Marbrisa Ave., Huntington Park, Calif.—ED.

Baking Oven

We are interested in obtaining information relative to a small baking oven, capable of temperatures from 350° F. up, for baking wrinkle finishes on instrument cases. The instruments have a 6-in. square front plate with a box about 4-in. square and 4-in. deep on the back. The oven is expected to bake approximately 30 at a time. We would appreciate your kindness in turning this over to some of your advertisers.—J. M. Co.

Information given.—ED.

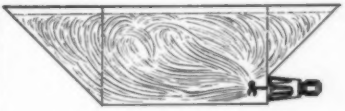
Coated Fiber Board

On page 7 of Nov. 1942 issue, I notice one of your readers asked for sources of pyroxylin-coated fiber board. We can recommend two sources: The Upson Co. (Coated for soft fiber) Lockport, N. Y., and Marsh Wall Products Co. (For coated hard presdwood board) Dover, Ohio. — The Varnish Products Co.

Solvent Recovery Equipment

We wish to acknowledge and thank you for your letter requesting information pertaining to distillation equipment for reclaiming used solvents such as lacquer thinners.

We do manufacture equipment of this kind and are sending you two copies of our general catalogue, a part of which is devoted to solvent-recovery equipment. Inasmuch as the units we manufacture are designed for particular services, we do not have standard equipment available but de-



Agitate Dipping Tanks with "LIGHTNIN" MIXERS

Here is a way to get dipped finishes that will be certain to meet Army specifications and pass inspection. Use *"LIGHTNIN"* Mixers on your dipping tanks.

This mixer will prevent the settling of heavily pigmented, thin paints so that uniform coating can be constantly maintained.

If mixing or agitation is one of your problems, consult Mixing Equipment Co., Inc., whose mixing experience is yours for the asking.

Note on Priorities: All offerings and specifications are subject to such government regulations as may be announced from time to time in connection with critical materials. Immediate shipment on many models and parts.

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"smooth sailing" with

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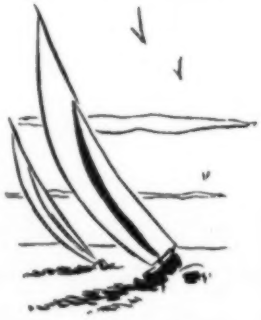
Army-Navy SPECIFICATION FINISHES

These finishes, in stock for immediate shipment, include lacquers, primers, synthetics, cements, dopes and thinners . . . all tested and approved.

With SEA-LAC it's easy to change steel to brass, brown plastics to white, or put a porcelain-like finish on pressed paper. Get acquainted with the full range of SEA-LAC finishes. Hundreds of substitute finishes to choose from. Write today for information.

Duralac Chemical Corp.
84 Lister Ave. Newark, N. J.



sign each equipment piece for the job in question.

At the present time our entire engineering and plant facilities are engaged in the design and fabrication of chemical equipment vital to the war effort, therefore we can only accept work which falls in this category.

Should you desire any additional information do not hesitate to get in touch with us. Vulcan Copper & Supply Co., Cincinnati, Ohio.

Giant Dip Tanks

I am doing some research work on steel structures for post-war housing, and I have the problem of coating these steel structures to prevent rusting. Will you kindly advise me which company makes large automatic dipping tanks suitable for dip-lacquering and drying steel beams 14-ft. long. I would be much obliged to you for this information.—H. C. (Advanced Development Engineering).

Information given.—ED.

Whirling Machines

Would you please advise me where I might purchase either new or used centrifugal whirling equipment for the application of paint to small parts?—R. S.

In your Nov. 1942 issue of INDUSTRIAL FINISHING Magazine, you mentioned the Ronci Machine Co. Will you please forward our letter to this firm? —M. W. (Button Works).

Information given.—ED.

Tumble Finishing

I would like to secure information on tumbling finishes, or perhaps you could advise me where to buy a book of instructions on this subject?—C. H.

I am employed by a firm that manufactures and finishes wooden products, such as buttons, ornaments, handles and various commercial novelties. These products are finished by two methods, spray and tumble lacquer polish.

I am shop foreman, doing all the set-ups and routing of production throughout the plant. Also, I am quite adept at color mixing for matching colors in the spray department and spraying, but I have not had sufficient experience on the subject of tumble finishing.

We use paint products from three of your advertisers.

Could you give me the name of a book written on the subject of tumble-lacquer finishing, if there is one, or will you please refer me to a company

(Continued on page 80)

Maybe . . .

We're all better off than we think!

. . . "Can't get lumber!"

. . . "Can't get steel!"

. . . "Can't get this and can't get that!"

You hear it everywhere!

We are somewhat bewildered by the restrictions in our own business on gums, solvents, nitro-cellulose, oils, petroleum, drums, cans . . . and heaven knows what else!

BUT . . . *are we the ones to worry?*

We have a cause that represents justice and humanity for all, backed by the finest fighting forces on earth. Those forces are beginning to win ★ There is an arrow that points toward victory and it was shot from the bow of American ingenuity and courage ★ Let us make any sacrifices that we have to make. Let us make them cheerfully and gladly ★ And then let the other fellow do the worrying . . . Because there are places where worrying is going to be a major industry . . .

And three of those places are
Berlin, Rome, and Tokio.

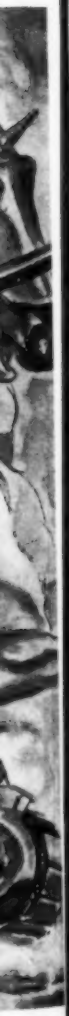
STILLE-YOUNG CORPORATION

MANUFACTURERS · CHICAGO

QUERS · FILLERS · STAINS · ENAMELS · PAINTS

THE LILLY COMPANY

HIGH POINT, N. C.



Armor *vs.* Armament.....

WAR IS AND WAS always a matter of armor versus armament, helmet and breastplate against the "good sword of Damascus"; coats of mail against arrows; Hannibal's phalanx and the adversary's pikes; the blazoned shield and the lance; forts and siege machines. Now it's steel tanks against armor piercing shells; armored ships against planes; tanks against planes; flame throwers, gas masks and the numerous other devices of today. Thus it is that through the centuries protective armor is half the battle. Today, protection goes further in that armor and armament alike must be protected . . . protected against attacks of the elements—metal against rust and corrosion and wood against warping, moisture and rotting. The Army, Navy and Air Forces which we are building require many types of protective finishes for metal, wood, plastics, fabrics, etc., and we of the Lilly Varnish Company are in position to furnish protective coatings to do that job. Our experience (over 77 years) and our facilities (plants at Indianapolis, High Point, Gardner, Mass.) are at your disposal.

N Y

LILLY VARNISH COMPANY
INDIANAPOLIS, IND.

Importance of the Finish

A GOOD public speaker adheres to the following principle: "Have something to say; say it, and sit down." By a like token, it would be wise for those who write articles to follow the same rule.

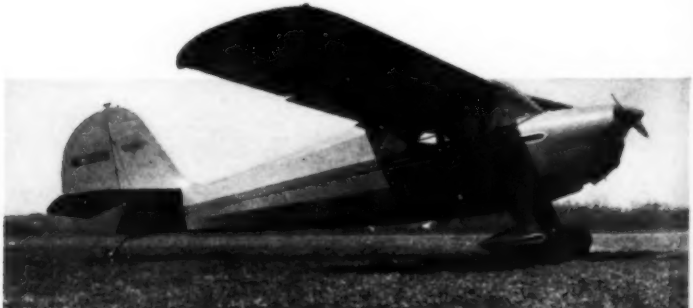
I have something to say and that something is about Aeronca airplanes, and how important a part modern finishing methods play in their creation. However, when I start to writing about Aeronca planes, I want to keep on writing and the Editor of this publication, figuratively speaking, will have to tell me when to sit down. It's a safe bet, though, that if I could get him to take a ride in an Aeronca Chief, he would give me at least two or three more pages of space. . . .

Every day most of us ride in automobiles to our places of employment, yet few of us think of the care taken to give the cars the durable finishes that are protecting them. All of us have noticed that when that finish is marred, the exposed metal underneath quickly begins to rust.

Protection of Sheet Metal

Now it is vitally important that such conditions must not affect the metal or wood or fabric surfaces of an airplane. How, then, are those sheet-metal surfaces protected? Some of them are fabricated from stainless steels that have corrosion-resistant qualities. Other surfaces are electroplated with nickel, chromium, copper or cadmium. However, to obtain lightweight non-corrosive surfaces of any size, another method is employed.

Most of the polished surfaces one sees on the modern airplane, if it is metal, are almost sure to be what is known to the trade as "Alclad." By this I mean that the center of the sheet is an aluminum alloy, and over its outside surface there is a very thin sheet of pure



in Our Modern Airplanes

BY H. J. ETHERIDGE

Pre-Flight Inspector
Aeronca Aircraft Corp.

aluminum, to protect it against deterioration from exposure to the elements.

Other metal surfaces, not protected as just described, must be treated with a coating of paint, lacquer, dope or some combination of materials that will produce the desired result.

Before any permanent coating is put on metal, all surfaces must be cleaned of oil, grease, dirt or other impurities. To obtain such a condition, specially prepared baths of diluted acids or alkalies or heat treatments are employed. After such treatment another procedure follows to counteract the harmful effects that the acid or alkaline baths might have on the metal.

Zinc Chromate Primer Is Rust-Inhibitive

Now we are ready for the actual coating of the metal. First, a primer coat of zinc chromate, or other suitable base coat, is applied over the entire area. I mention zinc chromate because it seems to be the most popular rust-inhibiting material on the market.

The essential requirement of the primer coat, other than the one just mentioned, is that it flow out smoothly to produce a film of uniform thickness, fill every surface pore of the metal, hold on to the metal with a firm tenacious grip, and provide a suitable foundation upon which can be built the finish coat. The primer coat must not become too brittle and hard, else the finish coat will not have a porous surface to cling to. Neither can the primer coat or finish coat become brittle and too hard because, in that event, any contraction or expansion of flexing of the metal would cause the finish to crack or chip off and expose the bare surface underneath.

If the metal thus treated is tubing, castings or sheet stock, the

treatment will be the same, to a great degree, except that in coating tubing another problem is presented. Here you are confronted with the problem of not only coating the exterior but also the interior surface of the tubing.

Coating Insides of Tubular Parts

Steel tubular members must be sealed to exclude the entrance of moisture. Aluminum alloy tubular members must be left open at the ends to permit drainage. Aluminum alloy tubular members must be finished on the inside of the tube the same as on the outside. The use of steel fittings in conjunction with aluminum alloy tubing is not practiced because of the peculiar chemical re-action set up by the breakdown of the steel and its effect upon the aluminum alloys. This re-action will be explained in the next few paragraphs.

End fittings used with open tubing must be designed to prevent pockets that might collect and retain moisture. After all welding and brazing operations have been completed, the interiors of the closed steel members must be protected by a coating of hot rawlinseed oil, or by a rust-inhibitor compound, or by a prime coat on the inside equal in quality to the prime coat on the outside. This material is generally applied by forcing it into the tubular structures under pressure, or by immersing the structure in a bath.

The material for coating the interiors of tubular structures is generally applied at a temperature of not less than 160° F. It must remain in the tubes for not less than two minutes. The liquid is forced into the individual tubes in the structure through small holes drilled in the tubes close to the end members—or it may be forced through an entire assembly by way of interconnecting holes at the strut joints. The presence of the liquid in the tubes is checked by noting the increase of temperature of the various tubes throughout the assembly. If the coating is applied by dipping, all parts must be rolled to prevent air pockets from holding back the liquid. The parts should remain submerged until all bubbling has ceased. Following this treatment the fuselage and wing structures are ready for covering operations.

For each individual piece used in an airplane the finish of that piece is almost as important as the structural quality of the piece and is so calculated on the drawings.

In this article I have tried to answer some of the questions that are constantly asked concerning the finishes used in new airplane construction.

H J. Sheridge

Protection From Corrosion

If the covering of the fuselage framework and wing structure is to be of metal, then the sheets that form this covering must be treated carefully to protect them against every type of corrosion. These precautions extend down to the smallest detail, including those rivets or screws that are used to

hold the completed structure together. The rivets and screws must not corrode and if they are of a metal other than the metal skins used in the covering sheets, they must be such that no harmful reaction will set up by contact of the two different metals.

In its pure commercial state aluminum is one of the best non-corrosive metals for airplane construction; but because of its soft ductile nature it must be alloyed with other metals to increase its strength. However, it still remains a strong electro-positive metal and, in its alloy state, will corrode rapidly when placed in contact with other metals in the presence of an electrolyte.

Great care must be taken to prevent contact between an aluminum alloy and copper or other similar metals. The effect of steel is not so great as copper. When such contact is permitted with copper, the aluminum sheet or tube disintegrates completely in a relatively short time, leaving the copper almost unaffected. Although this deterioration is not as marked with contact between steel and an aluminum alloy, it must be guarded against nevertheless. To obtain the desired results of strength and finish, when the two metals are used in conjunction, an insulating strip of fabric thoroughly impregnated with marine glue or bituminous paint is placed between the two metals.

Selection and Finishing of Wood Parts for Aircraft

If the wing covering is to be fabric, then another problem presents itself. Most wings having a fabric covering are built, in the main, from carefully selected wood. Here the problem of finish presents a two-fold problem: First, how the wood must be sawed, planed and dried. Second, the finishing of the surface to seal the wood against loss of essential moisture content or the entrance of additional moisture into the wood. The object, of course, is to prevent cracking, rotting and any breakdown of the wood.

To drop back for a moment to the problem of selecting the wood used in airplane construction, several factors must be carefully studied to obtain the necessary strength. First, the annual rings must be true and run parallel with the cut of the wood — with the wood grain of correct density. Second, the wood must be free of compression breaks, bright spots and deformations that could in any way impair its strength. No knots are permitted—none other than the small spike knot, and these are held to ¼-in. diameter, with not more than one in 10-ft. of length. All joints must be scarf joints, with a ratio of lap of 10 (in length) to 1 (in thickness).

Assuming that the wood selected comes up to all specifications, then it is ready to be worked into the proper shapes, glued and bolted together, and given the final finish specified by the engineers.

Wood, Properly Used, Is Strong, Light and Durable

Though all of us have lived in wooden houses and have used wood in furniture and other equipment all our lives, few of us give any thought to the factors that have made wood such an all-purpose material. In this age of steel and metallic alloys, perhaps it would be well to compare certain woods with steel. It is amazing, yet true, that spruce wood, in tension, is 2.6

times as strong as steel for the same weight and length; and, in compression, spruce is twice as strong as steel. The strength of wood, however, is affected by so many factors that the selection of aircraft wood of the proper grade makes it a fairly expensive material, hence the shift to metal.

When wood is used, one important requirement is to be sure that not less than 6% nor more than 12% moisture is carried in the stock selected—and this must be sealed in. When this is done, two things are accomplished. The grain structure of the wood is sealed so that it cannot lose its own moisture content; also, no outside moisture can enter. Two other purposes accomplished are the toughening of the wood fibers and the formation of a bonding agency on the outside that does not permit the feather-edges of the wood grain to raise. This treatment must also provide a suitable surface for the final finish which is to follow.

The Fabric Covering

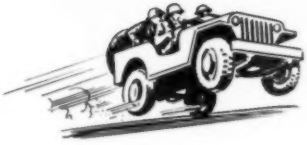
Next is the fabric covering (if fabric is used) that forms an envelope around the entire wing or fuselage structure. Here, one almost begins to doubt that a frail, white piece of cotton fabric could be treated and finished to stand the punishment and pressure exerted upon it. The quality of fabric used is specified by Government regulations covering such material. . . .

After the fabric is placed over the structure, a strong reinforcing tape is laced between the fabric and the lacing cord to prevent the stitches from tearing through the fabric and rubbing on the ribs. This lacing cord is of linen with a left twist of 9-strand unbleached cord. Finish is quite important to this cord, as it must be carefully waxed and tested to prevent the threads from fraying. After the wing is laced, the rib lacing and tape are covered with a strip of pinked-edge fabric, following which the final touches are given before the finish coats of clear dope and color are applied:

Applying Coatings of Dope to Fabric Surfaces

As we watch the various treatments given the fabric surfaces in the dope-room, we see a transformation take place that only the development of the finishing industry, in conjunction with modern lighting systems, could make possible. Here those surfaces are thoroughly impregnated with a nitrocellulose material which is brought to the proper viscosity with the delicately balanced proportions of ethyl acetate, butyl acetate, butyl alcohol and toluol. To obtain the best protective coating it is absolutely imperative that the dope room have a constant temperature of between 65° and 80° F., with a relative humidity of 65% at these temperatures. All lights in the dope room must be sealed and of the spark-proof type. Employes are not allowed to wear heel plates, nor is any condition allowed to exist that might cause a spark. Such precautions are necessary because of the highly inflammable and explosive characteristics of the materials used to produce the required finish. Perhaps, at this point many readers would like to know exactly the proper procedure to procure the finish demanded in modern planes.

Since we know that all parts of the ship have been properly pre-



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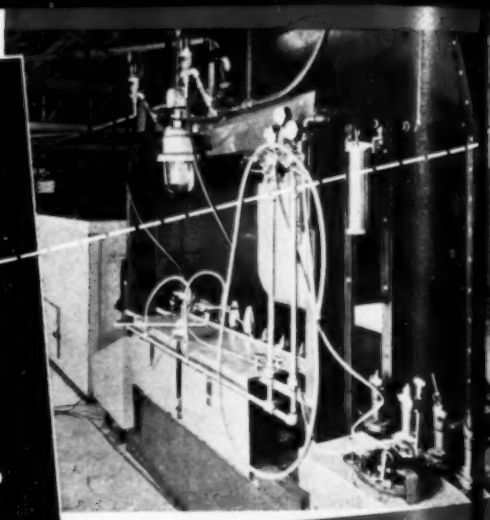

and what it means to

In a certain large shell loading plant of the U. S. Government Ordnance Department, BINKS Automatic Spray Finishing Equipment is coating the outside of shells in sizes ranging from 20 mm. to 105 mm. at the rate of 1000 an hour. The entire installation consists of 23 different automatic units.

HERE'S HOW IT'S DONE: The ingenious machine that attains this speed is the brain child of BINKS Engineers in collaboration with Army Engineers and the Government Contractor responsible for the operation of the plant.

The shell parts to be finished are placed manually on spindles which are mounted on a long conveyor chain. Simple masking rings and plugs are used to protect threads from becoming coated in the finishing process. The spindles with their loads first pass through a preheating oven which conditions the shells for finishing by removing all traces of moisture. From this oven the spindles carry the shells directly into a BINKS Dynaprecipitor Water Wash Spray Booth. Here the spindles

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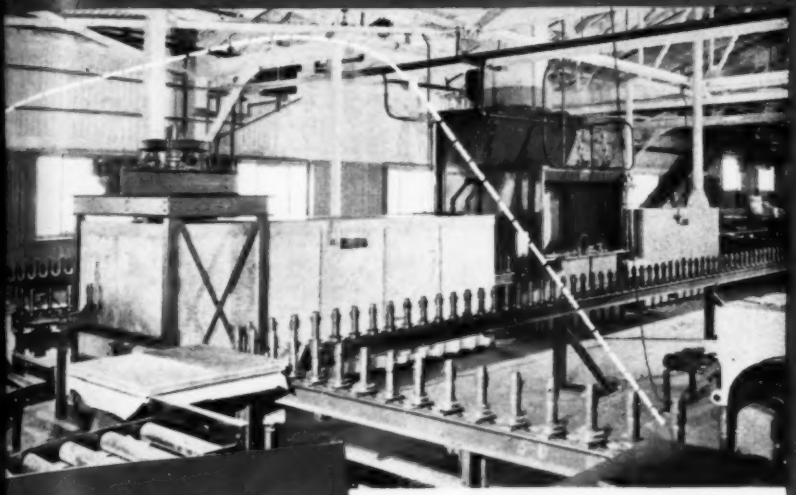

ans to You!

Over-all view showing BINKS equipment used to automatically finish 1000 shells an hour.

begin to spin rapidly and as each one comes in front of the automatic spray guns the shell on it receives a fine, even coating. To avoid waste the guns only operate when a loaded spindle is in front of them. The freshly coated shell is next carried into a BINKS drying oven from which it emerges about four minutes later completely dry and ready for immediate handling. In this way a shell is completely coated and dried every 3.6 seconds.

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pared, a coat of clear nitrate dope is sprayed onto the fabric surfaces "as is"—meaning full body and not thinned. It is this first coat upon which depends the future anchorage of the following coats, consequently dry brushing or "stretching" of the dope must be avoided. Proper saturation of the fabric and penetration of the dope calls for an evenly applied wet coat of dope. When this coating is completed the surfaces are allowed to dry from 30 to 45 minutes.

At this point it is optional whether or not the first application should be lightly scuffed with sandpaper. However, a thorough sanding must follow the second coat and each of the three succeeding coats. The result is a smooth polished surface, immune to water, and the fabric has been drawn to a drum-head tauntness by the shrinkage and hardening of the nitrocellulose, due to evaporation of volatile agents from the clear nitrate dope.

On completion of the clear dope treatment, the next step is the application of aluminum-pigmented dope. This consists of two heavy coats of aluminum pigmented dope, with a drying time of 30 to 45 minutes after each application.

Aluminum-Pigmented Dope; Where and Why It Is Used

Aluminum-pigmented dope is used after the clear dope and before the colored dope for three reasons. First, to protect the clear dope from the actinic or destructive rays of the sun, for it is upon the clear dope structure that the tauntness and life of the finish depends. Second, it is an effective building pigment; and third, it is easier to sand than any other pigmented coat in the building of a fine finish.

Aluminum-pigmented dope is prepared by the addition of 1½-lbs. of fine aluminum powder to each five gallons of clear nitrate dope. The powder is made into a thin paste before it is added to all of the clear dope for complete mixing. Following the aluminum pigmented coats, three or more of the desired color coats are applied. Then the structure is ready for final assembly.

Final Assembly of Plane

Upon reaching final assembly very little time elapses before the ship is in the air. If all the necessary coatings have been prepared and applied correctly and if inspection of all of the many pieces that constitute an airplane has been accurate, the picture on the drawing board in the engineer's office becomes a finished plane.

Through the various departments that those pieces travel, they depend chiefly upon one thing for the plane's airworthiness after final assembly. That one thing is the supervision and exactness of department foremen. We of Aeronca are fortunate in having the right kind of foremen. All of them are building planes because they like to build them. They are "flying high," as the old saying goes, when they are around planes. The Finishing Industry will Finish the Axis, and after this war we will fly still farther.

In these war times our managers, engineers and foremen must devise ways to do more with what we have, or what we can get.

What We Learned About D

We carefully check and control the viscosity of all finishing materials that we use.

DURING the past several years it has been my misfortune to have had charge of finishing rooms that produced high-volume low-priced wooden merchandise. Because of the keenest of competition, extreme economies of raw materials, costs, and finishing materials consumption had to be observed. Often finishing operations had to be completed by the tenths of minutes, or the difference might mean the difference between a profit and a loss.

I say that "it has been my misfortune," because of the method that had to be employed to finish these products in the most economical way. That method is the application of paints and varnishes by dipping.

Beyond all question, there is no more difficult method of coating wood than by dipping. There are so many variable factors that enter into the picture, any one of which can cause difficulty, that it presents a constant problem to the finishing foreman whose job it is to finish wood in this manner. Many a foreman has thrown up his hands in disgust, quit this type of finishing and gone back to other methods.

Because of this latter fact I am going to attempt to show, in this

Dipping Wood Furniture

BY KARL M. SCHAAF

article, how we overcame these obstacles. I will attempt to explain some merits of dipping in comparison to other methods, from a cost standpoint, and will show by illustrations and pictures the equipment used, and reveal our methods of control over the variables encountered in the process.

Kind of Dip Tanks We Use

The dip tanks should be made of sufficiently heavy-gauge steel to prevent any possibility of buckling. A dip tank should never be too much larger than the product to be dipped, because of the fact that the larger the surface area of the tank, the greater the evaporation of material on warm humid days. Too much evaporation of certain solvents can cause a loss of balance in the material itself, and even cause the mixture to go out of solution. This last is not likely to happen, however, if the source of supply has furnished a really good dipping material.

The top of the tank should be of such height as to cause the minimum of exertion on the part of a workman. A low tank, over which the worker must bend with every operation, can cause such fatigue as to greatly reduce the output. There must be strong steel casters under the tank to facilitate moving it to the different points of use, or to the tank storage place when it is not in use. Also, there must be a faucet somewhere near the lower edge of the tank to facilitate easy removal of the material for cleaning the tank.

For narrow parts and sub-assemblies, we use narrow tanks and avoid excessive loss of solvents by evaporation. Notice inclined drain and backboard. Tanks are always well covered when not in use.

It is also well to have a coarse mesh screen immersed in the tank, in level position, about 2 inches above the bottom, so that foreign particles can sink below the working space and not cause a dirty rough finish. Around the top edge of the side walls, there should be a U-shaped channel or slender trough to receive the lower edge of the cover. We pour solvent into this channel before putting the

cover in place (when operations stop for a while) and this affords an excellent guard against evaporation of the finishing materials when the tank is not in use. When a cover of this type is used, another cover should be placed over the first cover. The second will have sides extending down over the sidewalls of the trough, in order to reduce the possible fire hazard to a minimum.

Portable Drainboard; Fire Extinguishers

Assuming that the finishing room is conveyorized, there must be a drainboard underneath the products that are dipped to catch the drippings. This is a broad V-shaped metal or wood trough mounted on casters. It is of such height as to permit the materials to flow back into the tank — after passing through a fine-mesh screen. If the tank is too high to permit the materials to flow directly into it, the material caught in the container must be strained, preferably through cheesecloth before being returned to the tank.

The drainboard should be covered with heavy kraft paper to expedite cleaning. Paper should be spread over the floor where the product passes and over which the drainboard does not extend. The floor area under and around the dip tank should be covered with Masonite or something of the kind to prevent leakage of the material through to floor below, where it might cause considerable damage.

Because of the fire hazard connected with dipping, extra caution should be exercised to prevent fires. A large 30 to 50-gallon fire extinguisher should be handy. Hand extinguishers should be convenient, and over each tank there should be one or more extinguishers as an extra precaution. The extra dip tanks should be stored in a fireproof room when not in use.

View of overhead conveyor line from which are suspended racks or "cars" loaded with dipped articles. At lower left you see part of a 50-gallon fire extinguisher and its cart. This is the tail end of one of 12 drying lines to which loaded cars are switched after the dipping operation.

Cleaning Dip Tanks

Cleaning the tanks is easy when there is a large tank into which the entire dip tank can be immersed in a caustic solution. After being cleaned, the dip tank should be thoroughly rinsed with water and then cleaned with lacquer thinner or naphtha. Any particles of caustic adhering to the tank, when fresh finishing materials are put in, can cause the entire batch to go out of solution. Although it is sometimes possible to restore this balance in the materials, the

whole batch might be spoiled. Circulating pumps, through which the material is strained, help to keep the contents of the tank clean, and therefore reduce the frequency of cleaning.

What Can Be Dipped

Toys, nursery furniture, nursery seats, novelty and occasional furniture, kitchen stools, chairs and tables—all can be dipped in all coats quite effectively. Dining-room tables and chairs can be dipped in the stains before wiping and can also be dipped in sealers. Several paint suppliers offer good dipping stains which dry quickly and require a minimum of effort to wipe and blend.

Several years ago we had a stain into which we dipped juvenile chairs and, after a suitable time had elapsed, we wiped off the excess stain—and the actual work took only about one minute. On novelty furniture, end tables and the like, we never spent more than two to three minutes for the entire operation.

We Dip Lacquer Sealers, Oil-Type Primers, Enamels

I believe that the easiest materials to work with in dipping are lacquer sealers and shellacs. These materials really satisfy the suction action of the wood fibers and cells when applied by dipping. No ribs, sags or runs are left on the product when the viscosity of the material is just right. . . . Care should be exercised that the proper materials are used—preferably a lacquer sealer that can be cut from 200% to 300% with lacquer thinner. The low tank cost of the material will probably surprise you.

The oil-type primers and enamels are the most easily controlled in dipping, although in some instances it might be necessary to use lacquer enamels and primers. The articles should be hung in such a way that the clinging beads appear on one corner only. Then these beads can be brushed off with a soft brush just about the time that the material sets. Slow-drying solvents should be used in order to keep the film surface open just as long as possible to avoid pile-ups or sags.

Both primer and enamel should be of approximately the same color to insure depth of color and to avoid what might appear to be a bleeding-through of the primer on the part hanging at the top. Where

Above this conveyor line of freshly dipped products, two fire extinguishers are mounted in such a way that heat from a possible fire will melt the fusible links, thereby allowing each extinguisher to swing into active position and spray its contents down over the entire area. If you look closely you will see one extinguisher above and back of the electric light. The other one is across from it to the right, but farther back. The wheel, which shows so clearly, is part of a device for operating the conveyor-rail switch.

lack of space or drying equipment prevents overnight drying, dipping lacquer primers and enamels can be used if the drain does not have to be too long. Usually the product can be removed from the line and packed four hours after the first coat has been applied.

Problems in Varnish Dipping

Some time back, tung-oil varnishes became so expensive and hard to get that we had to switch to castor-oil type varnishes. This presented us and our paint supplier with many complex problems. At first the varnishes were not tank stable; they would go out of solution within a week after being placed in the tank. After having corrected this condition, we found that the constant airation of the material caused by the immersion of the product into the tank, resulted in the same difficulty.

It took almost six months of constant work between us and our source of supply before we finally worked out all the kinks in this type of varnish, when used for dipping. A much slower naphtha had to be used than in the old tung-oil type varnish, because the surface had to be kept open about 30% longer in order that all of the excess material could run off.

Our biggest problem in varnish dipping arose in the dipping of

Here you see a line of overhead conveyor cars to which operater hangs freshly dipped parts and sub-assemblies. Narrow dip tank appears at lower right; suspended fire extinguisher is shown at top center; another one appears dimly at upper left, near the electric light.

panels about 30x40-in., framed by grooved rails about 2 inches wide. Not the least of our worries occurred each night before leaving. After carefully inspecting the day's work, it appeared that our tests and controls had all been wrong for that day, because the finish looked skinny and rough. Next morning, however, the appearance would always be satisfactory and we knew our control over the variables had again been accurate.

Controlling the Variables

We have narrowed down our control over dipping to three variables, and by means of this control we enjoy success in dipping wood furniture. These three variables are: 1) the paint, 2) the solvent, and 3) the weather.

We deal with the most reputable of paint suppliers and enjoy extremely good cooperation with them. They understand our problems and see to it that our paint is always up to the proper specifications. This complete cooperation affords us the best of control over our paint. However, we do check the viscosity and solids content of each different batch we receive. This precaution gives double protection.

We enjoy this same cooperation with our supplier of solvents and thus effect control over our solvents. Our laboratory runs periodic tests on solvents to make sure that they are always uniform, and it is seldom that we run into difficulty here.

The third variable, the weather, is a different matter. Our plant is on land that juts out seven miles into Lake Michigan. Whenever the wind comes from any direction other than the west, it sweeps directly across the lake and causes frequent extreme changes in humidity. I have seen the humidity rise so fast that our varnish-dipped jobs, which had been perfect in the morning, were full of runs and sags in the afternoon. Here lies one of the chief difficulties in dipping. It takes over an hour before one can tell whether or not the varnish is draining off properly, and in that hour some very unsatisfactory work can be turned out.

We have set up charts on each of our dipping materials showing what the proper viscosity should be for each product we dip. Before dipping any article we test the viscosity to make sure that it coincides with what is shown on the chart. After having tested several different articles, it is quite simple to chart the proper viscosity for each article. We test viscosities with a viscosity cup and stop watch every three hours, and on humid days we make these tests even more often. Thus, we control results caused by changes in the weather.

Although it presents many problems, finishing wood furniture by dipping still offers possible savings in material and labor—and today that is what Uncle Sam really appreciates.

New War Products Development Laboratories

Announcement is made by The Curran Corp., Malden, Mass., of the opening of a new War Products Development Laboratory to be located in the Processing Plant, Prospect Mills, Lawrence, Mass. It is stated that the purpose of the Laboratory is to put its creative chemists on the development of both offensive and defensive war chemicals. Problems will be attacked from a new angle and without reference to contemporary work.

Training Girls to Spray

BY W. BEACHAM

MY EXPERIENCE with training female help has not been confined to war production only. Several years ago I convinced the management of a large corporation, after many an argument, that girls would make better spray hands than men. I found production could be speeded up better than 30% by proper training. Now that it is practically impossible to obtain male help, industry has been forced to hire girls.

Girls have a definite niche in the spray room, being able to adapt themselves to certain types of work more freely than men. I have found that when a man puts himself into a rut—say by handling a spray gun improperly, such as carrying his stroke beyond the edge of the article painted, or using too wide a spray—he is usually unable to pull himself out. A girl, on the other hand, endeavors to copy her instructor's movements. Regardless

When I told her to put more rhythm in her spraying she really stepped on it, and how!

of what others may tell her, her usual comeback is, "Mr. Smith showed me this way, and this is the way I'm going to do it!"

I've found that best results can be obtained by teaching the girls individually. A word of praise at the start of their instruction will tend to calm their natural nervousness. No matter how many runs, missed spots, or orange peel, a pat on the back telling them how fast they are learning will loosen up that stiff arm and give the spray gun a steady movement.

Rhythm in Spraying

Rhythm plays a large part in successful spraying. Female help have more rhythm than male help. A rather amusing experience I had with one girl was when I told her to get a little more rhythm to her strokes. She complied by giving more rhythm to her entire body. She was wearing slacks (slack only around the ankles) and would slide along about three steps while following the article being painted. Then, with a graceful body movement, she danced back ready for the next piece. I had not attended a dance for years and the sight of this made me realize that I was getting old and out of date, where modern dancing is concerned.

A little correction soon made the girl realize that I wanted rhythm in her arm movements only. Before the day was over, I had an expert spray hand. To obtain the desired movement of her arm, I turned the atomizing nozzle to produce a horizontal spray (a flat level fan) while spraying horizontally (with gun held in normal position) so that the girl had to turn her gun to obtain a vertical spray. Moving the entire arm back and forth overcame the tendency to swing the gun like a garden hose. She learned to keep the gun the right distance from the article being painted its full length, without spraying 6-in. or 8-in. beyond the edge of the work.

After a few days of this I turned the nozzle to a 45° angle so that it would be possible to spray horizontally or vertically with a slight twist of the wrist, still making it impossible to swing the gun back and forth. Upon checking the amount of paint used and the amount of reclaimable sludge in my water-wash system, I found that by this method my overspray was only 35%.

In a conversation with the manager of a large automobile plant, I happened to mention this fact. Although he did not call me a prevaricator to my face, I understood what he meant. Later, one of his assistants called on me and together we checked the finishing line, and he agreed with me that 35% was correct.

Girls Learn to Clean and Repair Spray Guns

The guns used at this time were of the type wherein the fluid needle comes through the fluid tip, with the shoulder for shutting off paint about 1/16-in. from the end, the purpose being to push dirt and skins through the fluid tip. I found that this needle going through the tip caused a great deal of wear, and fluid tips and needles had to be changed constantly. Singling out one of the girls to clean and repair guns, I explained the principle of the spray gun and told her to "play around" with the gun until I returned. I left to check another production line. Upon my return I found that the gun had a new needle, fluid tip and light coat of machine oil. I had not mentioned oil to this girl and she had not intentionally oiled the moving parts. Her object was to stop

paint from sticking to the gun, which had made it so much harder to clean. I gave the girl a small raise in pay for using her own brain. This caused a little jealousy among the other girls, but within a few days each girl was cleaning and repairing her own gun. I then decided to change the type of guns and use the one with the needle machined to a point, the shut-off being at the tip instead of 1/16-in. back from the tip. The reason for this change was to cut my repair bills. The new guns had a different grip, feel, balance, and were heavier, but within a few minutes the girls had learned the knack of handling the new guns and were doing excellent work with them.

Finally orders came through to double production. It was necessary to install automatic equipment. I was very sorry to have to transfer some of my girls to other departments, but they succeeded very well on punch presses, drill presses and at welding. The girls I had left soon adapted themselves to the care of automatic spray guns and spent most of their time inspecting the finish before products left the spray booth.

Results I Obtained in a Southern Plant

A few weeks ago I was asked to go to an ordnance plant in one of our southern states, to try to speed up production. I was warned that southern workers did not produce as much in a day as those in the northern states, and that I would be putting myself on the wrong side of the fence by trying to speed them up. This statement I found to be wrong.

Our first job was to move the spray equipment to a different building. About 10 men were detailed for the job. They all moved as one body—no slacking—and in record time all of the equipment was ready for production. At this point I found myself in trouble. The men working on the production line were hired because they knew how to spray—but they had never heard of a viscosity cup. They didn't know that one solvent will evaporate faster than another, and straining paint was beneath them.

I asked the management to detail enought girls to me to operate one automatic unit. They asked, "What about the other unit?" I told them that I believed the girls could more than treble production of both units by using the one unit and holding the other as a spare, or they could hop from one booth to the other for different jobs.

I spent four hours explaining everything to the girls and told them they would be entirely on their own, without supervision. Yes, I had to hop in several times to straighten out a few mistakes, but within five days those girls had jumped production from 10,000 pieces in three 7½-hour shifts to 19,000 pieces in one 8-hour shift. It sounds incredible but proof is waiting for skeptics.

We know we are able to produce, so let's do it, finishing superintendents, industrial engineers, managers and foremen. Take off the collar and tie. You will find a great pleasure in showing some one else how to do as good a job as you have been doing yourself. Your chest will swell with pride at the results. Your employes will admire the fact that you are not afraid of getting dirty, and your production will jump beyond your expectations. We have made one more step toward equality of the sexes. After the war is over, all of us will have a better education in many things and there will be a better living for all.

Streamlined Cleaning

OF METAL SURFACES IN WAR PRODUCTION

BY CLAUDIUS NIELSEN
Nielco Laboratories

WITH the President's call on our industrial empire to put forth all possible speed for all-out production of armaments, came the call for streamlining every operation possible. Practically every industrial plant has at least one department where cleaning is an important job. This also was included in the order—calling for better cleaning, with less equipment and at a greater speed.

In one of the war production plants the cycle of operations was to be three minutes. The cleaning had to be done within this time limit in order to eliminate bottlenecks. More than that, it had to be done without the usual resort to chlorinated solvents, as there was no time to wait for the equipment necessary to use this type of material.

In order to determine how far I had to go to produce a cleaning compound that would meet such conditions, I made up samples from old formulas that had been in use over a period of years. These formulas included some of my own as well as those of others, including some taken from the specifications of a large corporation. I also used samples of nationally-known cleaning compounds.

Method of Testing Cleaners

The method of testing these compounds was as follows: Each compound was used at a concentration of 6-oz. per gallon, at a temperature of 212° F. Panels were dipped into a beaker containing S.A.E. 50 lubricating oil; then removed and allowed to drain for one hour at room temperature. Each panel was numbered and immersed in the solution under test at exact timing.

These tests proved discouraging, as the average time required was better than 30 minutes—far too long to play any part in high-speed streamlined cleaning.

Before I attempted to produce the type of alkali cleaning compounds that were demanded, I made a survey of the type of equipment available in different plants. I found that in some plants there would be nothing more than large still tanks, while in others there were or would be some type of power washers. From this I determined that there would have to be two types of cleaning compounds developed, one for use in still tanks and one for use in power washers.

The first job was to produce a basic formula. After I had the

basic formula developed, my next task was to produce an aluminum and magnesium alkali cleaner, that would do the following: Produce a chemically clean surface in not more than three minutes, at a concentration of not over 8-oz. per gallon, at boiling temperatures, in a still tank; also strip zinc chromate primer and lacquer in not more than ten minutes without attacking the aluminum. Through the cooperation of a large aircraft plant I was able to accomplish this.

Using S.A.E. 50 lubricating oil as the medium for checking the cleaner's effectiveness for removing oil, panels were dipped into the oil and allowed to drain for one hour at room temperature. Then, using 4-oz. per gallon of the aluminum and magnesium cleaner, the panels were immersed in the solution at boiling temperature. In one minute and 28 seconds the oil was completely removed. Using 8-oz. per gallon, the job was accomplished in 42 seconds. When the panels were rinsed under running water they took a perfect watershed, without a break.

Stripping Action of Cleaner

Using 8-oz. per gallon at boiling temperature, this cleaner stripped zinc chromate primer in less than five minutes, and primer and lacquer in eight minutes, without attacking the aluminum and without damaging the anodizing. Stripped panels were left in the boiling solution for 24 hours; then removed and checked for loss of metal. This check-up proved that there had been no attack on the metal whatsoever.

Removal of carbon and oil from aluminum metallized cylinders of the Pratt & Whitney engines was another task demanded by the Army Air Corps. This took me directly into the repair depot where the work had to be done and where workmen were removing the carbon with wire brushes and steel-wool. The metallized coating of aluminum on the cylinders is about 0.005-in. thick, hence there can be no etching of this aluminum surface. This cleaner again met the demand made on it, as evidenced by reports and motion pictures taken of the work done by the Army Air Corps.

Anodizing or Alrocking

To clean aluminum prior to either of these operations is very important. Some plants are still using caustic soda for this job, which is wrong, as it has been definitely proved that etching of the aluminum reduces the corrosive resistance of the metal. By using a cleaner that produces a chemically clean surface without etching the metal, a perfect anodizing or alrocking job is assured. Also, the metal retains a higher corrosive resistance. And, by the metal being chemically clean when it enters the coating tanks, a perfect uniform coating is assured.

In the dichromating of magnesium, it is likewise important that no etching of the metal takes place and that a chemically clean surface is obtained before passing the metal over into the hydrofluoric acid tank.

What makes this cleaner different? There is much more to the formulating of a satisfactory cleaning compound than just throwing several types of alkali together. A chemist asked me if this cleaner contained tri-sodium phosphate, sodium carbonate and sodium metasilicate. My answer: "Yes."

"Does it contain wetting agents?"

Again, "Yes."

"Well then, what . . . ?"

In formulating this cleaner, each item incorporated into it was care-

fully checked for its cleaning action, and then compounded to produce a certain job, just like good coffee is carefully blended.

In the development of a satisfactory aluminum and magnesium cleaner it has been definitely proved, not only in the laboratory but on the production line, that it is possible to dispense with expensive chlorinated solvents. You can produce a chemically clean surface and do it quickly.

Realizing that many plants are using power-washing machines, a thorough study was made of this type of cleaning. To have one cleaning compound suitable for use in both power washers and still tanks, and do efficient cleaning in both, just doesn't make sense. In one we have chemical action aided by pressure spray; in the other, nothing but chemical action. Hence, if a cleaning compound is made up for use in a power washer, then it certainly can not be very effective in a still tank, no matter at what concentration it is used.

A cleaning compound made for use in power washers should not have any wetting agents, sodium resinate or other saponifying agents, due to the suds that would be formed, whereas such agents can be employed to great advantage in still tanks.

Example 1

Trisodium Phosphate	50
Sodium Metasilicate	30
Soda Ash	20

Example 2

Trisodium Phosphate	50
Sodium Metasilicate	30
Soda Ash	13
Sodium Resinate	5
Wetting Agent	2

Example 1 is intended for power washers, but it certainly would have no value in a still tank. For cleaning value, it has little to offer, as it does not remove S.A.E. 50 lubricating oil quickly enough, because it takes over one hour, using 4-oz. per gallon at boiling temperature in a beaker. Such a cleaner would never produce a chemically clean surface in any power washer.

Example 2 could not be used in a power washer, at it would form too much suds. It would fit better into a still tank, although it is too slow for that job because it takes more than 30 minutes to remove S.A.E. 50 lubricating oil at boiling temperature, using 4-oz. per gallon.

A cleaning compound suitable for use in a power washer, must be able to produce a chemically clean surface on all parts passed through the cleaning chamber, without resorting to the use of chlorinated solvents or any other cleaning aid. I will take, as examples, two of the plants using power washers, where I checked cleaning operations.

Examples of Inadequate Cleaning

Plant 1: In this plant, tool steel was cut to lengths of from 10 to 12-in. After being machined these pieces were packed into steel trays measuring 10x14x10-in. The steel was packed solid. The power washer was a conveyor type. The cleaning compound in use was a nationally known brand and was used at a concentration of 6-oz. per gallon at 185° F. It required 1½ minutes for the tray to pass through the spray of cleaning solution.

Upon examining the steel after it had passed through the unit, we found that the top pieces were poorly cleaned. Traces of oil were still on them. When pieces below the second row were pulled out, we discovered that they had been barely touched by the cleaning

solution. Department heads advised me that this was the best kind of cleaning they had been able to get, having tried several different compounds.

Plant 2: In this plant they were cleaning treaded bolts. The oil on these bolts was a regular emusified cutting oil. The power washer here was larger than in Plant 1, but the type of solution was the same and it was used at the same concentration, but at a temperature of 200° F. Upon examining the bolts as they came from the washer I saw that they too were poorly cleaned, although they were not packed closely like the tool steel in Plant 1. The metallurgist informed me that the bolts went from the cleaning right into the heat-treating furnace — and this was causing them to be covered with carbon due to the improper cleaning. In this plant they had tried various types of cleaning compounds but had found none that would do the cleaning as it should be done.

In some of the plants using power washers I found some criticism of the power washer, but I am sure there was nothing wrong with any of those that I saw. If a power washer had to be made to produce a chemically clean surface with some of the cleaning compounds I have tested, the plant would probably have to be enlarged to take care of the much longer washing units that would be necessary.

Cleaning Operation Timed With Other Production

From work I have done along this line I know that compounds can be produced which will do the proper cleaning job within the time to which these units are set to operate—but the cleaning compound has to be able to produce a chemically clean surface, in less than 60 minutes; yes, in less than 30 minutes. First the cleaning compound must clean all parts alike, regardless of whether they are packed or single when they pass through the cleaning chamber.

Second, the compounding must be done with respect to the timing of the unit as it pertains to passing the parts through the cleaning chamber. To do this one must determine how much the spray pressure (at which the solution hits the parts) reduces the cleaning time.

As a demonstration, let us take a cleaning compound that has been developed to use in a power washer, and which has proved to produce a chemically clean surface in not more than 20 minutes, in a beaker, at a concentration of 4-oz. per gallon, at 212° F. Let us say it has been found that the spray of hot cleaning solution (200° F.) at the same concentration, reduces the time it takes to produce a chemically clean surface by one twelfth. Then it should produce a clean surface in 1¾ minutes. This should be ample to meet the timing of any machine in use.

If the timing in the beaker is 60 minutes, then the time required to clean it in the power washer would be five minutes, which is much too long for most of the units in operation. When it is known that some of the cleaning compounds sold for power washers require more than one hour to produce a chemically clean surface in a beaker, according to methods described, it can be readily seen that they have no chance whatsoever to produce the type of cleaning required in a power washer.

My suggestion to those who use this type of equipment is that when a new cleaning compound is

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offered, get a sample and check it in the laboratory. This is easy to do. If the cleaner is for ferrous metal, brass or copper, dip some small panels into S.A.E. 50 lubricating oil, obtainable at your gasoline station. Remove them from the oil and allow them to drain for one hour at rooom temperature. Heat a beaker full of water, using one large enough to hold the panel to be cleaned.

Dissolve the cleaning compound in the proportion of 4-oz. to the gallon (28 grams to one quart of water) and bring it to a boil. Immerse the panel in this solution and keep the water boiling. Check the panel every minute for the first 10 minutes. That will readily tell you whether or not the oil is going to be completely removed within the 20-minute period. If it takes more than 30 minutes and the timing for passing the parts through your washer is not more than two minutes, then that cleaning compound will never give you the kind of cleaning you want.

Now in case there is someone who does not know what is meant by a chemically clean surface, I will try to make it easy to find out. Next time you wash dishes, while your wife is at her job in the defense plant, after you think you have got them all clean and dry and are ready to store them away, take one or two of them, particularly plates, hold them under the running cold water and see if there are any spots where the water breaks, as on a duck's back. If there is, you did not do a good job of washing the dishes. You probably used the wrong type of dish-washing compound. If the plates are chemically clean the water will flow over them in a perfect water-shed, without a single break. Try the same test on the metal you are cleaning, and you will soon get on to the kind of cleaning compounds that really clean.

It may be asked by those not familiar with the meaning of "S.A.E. 50 lubricating oil," what is meant by this description. It stands for Society of Automotive Engineers, 50 viscosity lubricating oil. The reason this oil is used instead of lighter or heavier oils, is that it is "in the middle" of the oils generally used. In fact, it is seldom that a heavier oil is ever used for coating metal. Tests can be made with other oils, so long as the same viscosity of oil is used in all tests.

Cleaning in Still Tanks

Having covered the cleaning by power washing units, I will now step over to the cleaning in still tanks. While there is no timing of the tanks themselves, there is in every cleaning process a cycle of operations from the first step to the last in the finishing or coating of the metal, be it painting or plating. This cycle must be taken into consideration when selecting a cleaning compound, as much as in the case of the power washers. For instance, if it takes five minutes to spray the paint on all of the metal cleaned in a still tank at the time, then the cleaning operation at the tank must not take more time than that. Really it should not be more than four minutes, because the metal has to be passed through the rinsing tank also, and this takes time too.

If the cleaning operation is in an anodizing department, where more than one tank is in use for anodizing, then the cleaning operation at the still tank must not take up more time than is required to keep the metal moving through the tanks.

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Now then let us look into some of the various types of commercial cleaning compounds. Of four aviation (aluminum) cleaners checked in the laboratory, none would meet a cycle of operation of less than 30 minutes without the aid of chlorinated solvents, or a pre-soak tank. In checking some 20 different cleaning compounds for use in still tanks for ferrous metals, brass and copper, none would meet a cycle of less than 20 minutes.

In the case of aluminum and magnesium cleaners, there is one operation where the cycle is not more than five minutes and sometimes it is as little as three minutes. It will be readily seen that a cleaning compound that can not fit into this cycle will create a bottleneck, and it has no place in our war-production plants.

As will be recalled, the introduction of this article covered cleaning compounds that would meet this cycle. In this case as well as in others a special formula was produced to handle the type of metal being cleaned in power washers.

Examples of Aluminum Cleaners

(U. S. Patent 2,037,566)

Trisodium Phosphate	63
Sodium Borate (Borax)	10
Sodium Silicate	25
Magnesium Sulphate	2

(U. S. Patent 2,155,045)

Trisodium Phosphate Monohydrate	32.75
Soda Ash	32.25
Sodium Metasilicate	20
High-test Calcium Hypochlorite	5
Zinc Hydroxide	10

Surely neither of these cleaners would fit into any cleaning operations where still tanks are employed, and they would not fit into any power washer, as their time of producing a chemically clean surface in a beaker, by methods indicated, is far in excess of 30 minutes. Even the addition of as much as 2% of a wetting agent and 5% of sodium resinate or other saponifying agent would not bring them into the field of suitable cleaners for still tanks.

Brass and Copper Cleaners

1

Sodium Metasilicate	50
Trisodium Phosphate	35
Caustic Soda	8
Tetrasodium Pyrophosphate	5
Wetting Agent	2

2

Soda Ash	47
Trisodium Phosphate	32
Caustic Soda	16
Sodium Resinate	5

3

Sodium Orthosilicate	85
Soda Ash	10
Sodium Resinate	5

4

Soda Ash	60
Caustic Soda	30
Sodium Resinate	10

These cleaners are purported to be suitable for the cleaning of ferrous metals, as well as brass and copper, in still tanks. If we check them for the time they require to remove the oil, as outlined, and to produce a chemically clean surface, I fear that we are going to be disappointed. First, they do not clean metal rapidly enough to meet any cycle of operations that I know of in our Defense Program; and secondly, they are certainly not suitable for cleaning either brass or copper, as they will darken these metals if the metals remain in the cleaning solution long enough to produce a chemically clean surface.

In checking into this phase of cleaning I again had the coopera-

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This storage space was necessary because it took this maker 3 days to paint and dry his huge equipment before it could be shipped. Then, Lowe Brothers developed finishes, which were acceptable to the Government, and which enable the equipment to be shipped within 24 hours after it enters the paint shop. The result is a 66% saving in department floor space—eliminating the need for a factory addition and giving greater efficiency all along the line.

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tion of several defense plants and arsenals. As a result I was able to produce cleaning compounds that would meet not only any cycle of operation, and not darken brass and copper, but would remove the tarnish from same, so that in many cases sodium cyanide baths and in a few cases, acid bright dips were eliminated.

Cleaning, no matter where it is done or what it is that has to be cleaned, is a tremendous job—especially when we consider all the cleaning that is being done of every type. It is an important job, yet as old an operation as it is, this war is proving that there is still plenty of room for improvement. Many problems are coming up constantly, proven if you wish to take a look at my desk and into my laboratory. Parts are being sent in from all sections of the country. While some can be cleaned with materials already developed, there are cases where a special product will have to be developed to do the job.

Removes Paint From Threads

A PIECE of used equipment comes in for overhauling and refinishing. It has been painted a number of times while in service. Perhaps you have trouble getting the old paint off threaded bolts. If so, get a nut to fit the thread and hold it in the vise while you file three or four notches down into it, through the threads, thus interrupting or breaking them at three or four points. This nut, screwed onto the threads, will cut the paint right out of them. The paint will escape through the notches made in the nut.

If by any chance you get paint into the threads of bolts made on the regular production line, make up one or two nuts as mentioned, and have them case-hardened so they will wear a long time. Still better, fasten the prepared nut into the center of an old machine handwheel. The weight of the rim of such a handwheel will allow it to be spun, so as to speed the thread-cleaning operation.—X. Y.

O'Brien Varnish Co. Makes Important Announcement

Announcement is made of the fact that Matt F. Taggart is now in charge of Industrial Finishes Sales for the O'Brien Varnish Co., South Bend, Ind. Mr. Taggart, the company's Director of Research for the past several years, is well known in the industry's technical circles and has been for many years an active member of the National Farm Chemurgic Council, having been appointed by Governor Schricker to be a member of the Indiana Chemurgic Commission.

The O'Brien Varnish Co. was founded 67 years ago as a producer of industrial finishes and has enjoyed a large volume of business in this field all through the years, supplying production finishers with a very large variety of paint, varnish and lacquer products.

At the moment plans are under way for a considerable expansion of the company's facilities for supplying the increasing demands of the many midwestern manufacturers engaged in making war materials which require the use of specification finishes.

Sign Increases Output

War Production Institute, with headquarters at 1991 E. 66th St., Cleveland, Ohio, is distributing to war plants a sign created by the United States Government for the purpose of raising employe morale and increasing industrial output.

The sign is available to plants that are devoting 50% or more of their production to the war effort. It is printed on high grade banner sign cloth in brilliant red, white and blue. The dimensions are 48x72-in. It will last one year under normal conditions.

The sign has been used in a number of test cases and has been found to stimulate new effort and reduce slowdown tendencies among the personnel.

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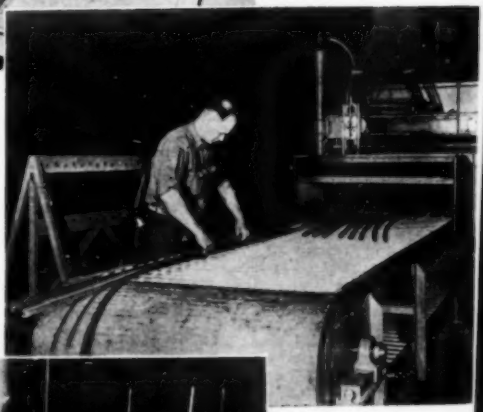
Paints — Varnishes — Lacquers

Whipping across the endless procession of small parts are the automatic spray guns, spreading an even coat of corrosion-resistant paint on the pieces soon to be included in the construction of a Martin bomber. Two such units comprise vital phases in the process.



Parts, painted on one side, are started down the line on a duplicate set of equipment. When they reach the end of the second phase in the robot spraying process they will be completely covered with a protective coat of corrosion-resistant paint.

Small parts, slated to play a vital role in the construction of Martin bombers, are first given a primary coat of protective paint. Here they are starting on their way through the robot sprayer that has brought a tremendous saving in manpower and time to the Martin production line. Today five men do the job in a third of the time formerly required for 15 men to complete the process.

Aircraft Parts Spray-Painted Automatically

A ROBOT PAINTER that sprays automatically the multitude of parts that comprise Martin bombers has been installed by The Glen L. Martin Co. of Baltimore. Operated by five men, the device does in a third of the time the work that formerly required 15 men to do. Ten men, badly needed for other work, are released from using hand-operated spray guns.

Made for the Martin Co. by a spray equipment manufacturer, numerous refinements and improvements have been added to adapt the machine to aircraft work. One such improvement is the stack and ventilator arrangement which keeps fine particles of paint from being drawn out through the stack into the air over the roof of the building. In the past the fine paint "dust" presented a fire hazard. Today the excess paint spray is filtered through a veritable waterfall and is collected in a big tank under the paint racks, later to be skimmed off with ladles.

Other changes in the machine brought about by Martin engineers include the addition of two hand-spray booths on each cycle of the machine, changes in the drying oven and various improvements which were found necessary.

The machine itself is in two banks, or cycles, and works on the endless belt system. Small parts that have first been cleaned and anodized are brought in baskets on the overhead chain conveyor system to a station near the robot paint sprayer. These parts are of various shapes and sizes; some of them slated to go into Navy patrol bombers; others go into the construction of bombers for the Army and the British.

Taken from the baskets, the pieces are started on their journey through the robot sprayer. Placed

At the end of their journey through the robot paint sprayer, parts are completely covered with a protective coat of paint. Here they are being removed from the endless belt and placed in bins, ready to move on to the production line. Parts of all shapes and sizes undergo the robot paint spray treatment.

After having passed under the sprayer and through the ventilator unit, the freshly painted parts move through the infra-red oven and fan dryer unit. When the parts have passed through the drying units they are removed from the belt, turned over, and started on the second phase of their journey.

on the cross-bars of the endless belt, they are first carried under a set of overhead spray guns that whip back and forth across the moving pieces. As the belt moves on, the parts are carried through an oven equipped with infra-red lamps designed to speed the drying process, and then through a second drying unit where numerous fans force warm air over the parts.

The infra-red lamps are so arranged that they may be turned on in units of four or more, depending upon the type of paint being used at the time. If the paint drys rapidly of its own accord, it is not necessary to use the lamps at all; if the paint is a slow dryer, then the lamps are turned on. This infra-red oven also makes it possible to increase the speed of the machine.

The numerous parts, after having passed through the ovens, now completely dry and painted on one side, are taken from the conveyor which comprises the first cycle of the operation, turned over and placed on the other conveyor which travels in the opposite direction. Thus, the second cycle in the operation, a duplicate of the first, is started. When the pieces have reached the end of the second cycle, they are completely covered with a primary coat of anti-acid paint which is designed to eliminate, so far as possible, the action of corrosive elements on the metal.

The whole process, from the time the parts are started on their way through the machine until they have been removed and sent on to finished parts stock or the assembly line, takes about 15 minutes.

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Application Problems
INVOLVED IN USING ES 680

BY NORVEL S. THOMPSON

THE finishing of army material with lusterless enamels and other materials coverd by Holabird Quartermaster Depot Tentative Specification ES 680 has brought about a number of problems that previously didn't exist—or problems that were considered unimportant. Today, however, manufacturers must recognize these problems and take suitable precautions.

When using some of the many materials covered by this specification, perhaps the one hazard that is likely to give the most trouble is the fire hazard of lusterless enamel waste. These lusterless enamels definitely require more care in handling. In fact, a real danger exists in the dried spray dust of lusterless enamels. Because the dust of lusterless enamels is so much more porous than that of ordinary gloss enamels, oxygen passes through more easily, thus increasing the possibility of spontaneous combustion.

A number of fires are reported as having been caused in this manner and fire insurance companies are warning manufacturers of this danger. The use of water-wash spray booths, wherever possible, will reduce this hazard. Daily cleaning of any spray dust in and around spray booths is a matter so important that it cannot be over emphasized.

Rot-inhibiting Wood Sealer Presents Dangers, Too

Many products formerly made of metal are now being made of wood. These wood items will be subject to the same abuse as those previously made of metal, and they must show marked resistance to rot. In finishing wood parts covered by this specification, it is required that, after sanding, all pieces be dipped in a clear sealer. The type of sealer to use depends upon the final use of the article. On such items as trucks, vehicle bodies and other wooden equipment that will be exposed to the elements, the use of a rot-inhibiting type of sealer is mandatory. On wood surfaces that will be used inside, such as desks, either the non-inhibiting or the rot-inhibiting type can be used.

Precautions to Take

To the best of my knowledge, application of the non-inhibiting type of sealer does not present any real danger. However, the rot-inhibiting type contains a toxic agent which brings about a serious health hazard if it is sprayed. This health hazard is considered

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so serious by the Quartermaster Corps that the application of this type of sealer by spraying is discouraged. The specification also states that, "The Government accepts no responsibility for any health hazards attributable to the careless use of toxic agents." This type of sealer should be applied by brushing or dipping.

The toxic agents used in the rot-inhibiting sealer have been used for quite some time in preserving wood. Manufacturers of the basic agents have given suitable precautions for their use. In reviewing their literature on toxic agents we find that these materials may be somewhat irritating to the skin, although workmen vary greatly in their sensitivity to these toxic agents.

As a general rule, continued contact with such solutions should be avoided. Adequate ventilation should be provided in the vicinity of this work. Workmen should be advised to wash themselves with liberal amounts of soap and water after working with these materials. If there is any danger of splashing, workmen should wear goggles and rubber aprons and gloves. The aprons and gloves should be made of a synthetic rubber. In case of accidental swallowing, an emetic should be administered and a physician called.

Metal Cleaning;
Primer Plus Enamel

Because most army equipment will be subject to hard usage, the cleaning of metal surfaces before painting is very important. According to the specification the use of a phosphoric-acid-type cleaner is mandatory.

Within certain limits the durability of any finish film is directly proportional to the thickness. The specification takes this into account also. The dry film thickness of the primer must be no less than 0.6 mils. Over the primed surface it is necessary to apply two full spray coats of the proper enamel in a film thickness of no less than 1½ mils. An electrical gauge suitable for measuring film thickness is available.

This specification covers a number of materials. For most uses, manufacturers need not be concerned about any more than the following:

Class-1 Rust-inhibiting primer
Class-2 Refinishing primer
Class-4 Lusterless O.D. enamel
Class-38 Clear sealer

Class-1 primer is used on steel parts. Class-2 refinishing primer is used to refinish old work and on new wood. Class-4 enamel is used over either one of the above-named primers and is the most popular color of all the lusterless enamels. Class-38 is the clear sealer that is to be used on new wood before the prime coat is applied. This last-named material can be had either in the rot-inhibiting or the non-inhibiting type.

Air-Drying or Baking;
Consult Material Supplier

In almost every case the materials covered by this specification can be had in either the air-drying or baking type. Most paint manufacturers now have these materials formulated so that one material can either be baked or allowed to air-dry. In this way one material can fill a dual purpose in a manufacturing setup.

Sometimes it is desirable to use either a fast or a slow-setting material. This is controlled largely by the solvent balance used in for-

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mulating the finishing material. The specification does consider the solvents used but also permits the manufacturers of approved products to make whatever adjustments or alterations are found necessary to fit an individual need. *Manufacturers having contracts calling for their products to be finished according to these specifications should take up their finishing material problem with their supplier, so that a material can be made to fit a definite schedule and still be a specification product.*

The reducer that the manufacturer uses to cut the material to spraying, brushing or dipping consistency—whichever the case may be—is also outlined in the specification. It should be a blend of high-solvency thinner with a high aromatic content and a petroleum-type thinner. The use of this formula is not necessary, however. Manufacturers of ES 680 materials usually formulate so that straight mineral spirits of VMP naphtha can be used for this purpose.

Stenciling for Identification

In marking all army material, special stencil enamels, as covered by this specification, are to be used. This stenciling and marking should be applied by spray, using gummed-edge stencils. A dry film thickness of at least 1-mil should be applied.

Some parts of this discussion may seem a little frightening at first. In particular, the fire hazard of the lusterless enamels and the toxicity of the rot-inhibiting type sealer do present some danger. Suitable precautions can be taken and the chances for accident can be reduced to a minimum.

To insure meeting the specification on film thickness, consideration to this point should be included, and routine testing should be part of the production setup. The procedures for using specification materials are not inflexible and manufacturers who require major variations may obtain consideration for these changes by contacting the Chief, Engineering Section, Holabird Quartermaster Depot, Baltimore, Maryland.

Dr. W. R. Meyer to Direct Enthone's Research

Dr. Walter R. Meyer, on November 20, became Technical Director of The Enthone Co., New Haven, Conn. He will direct the development of new products and processes for the metal-finishing industry, as well as to assist in problems attendant with the application of the company's products in the finishing of war goods.

Dr. Meyer is widely known about the country for his many technical papers and lectures, and is a member of The Electro-chemical Society, American Electroplaters' Society, Electrodepositors Technical Society (England), Faraday Society, American Society for Metals and Sigma Xi.

"I see Pete is mixing up another batch of paint—or is it colored varnish, Jake?"
"Hard to tell, Elmer. If he keeps on trying mixtures of different brands of substitutes with the wrong thinners, he'll end up with synthetic rubber."
(Thanks to G. L. Gaston).

LACQUERS
SEALERS
ENAMELS
UNDERCOATS
STAINS • GLAZES
SHELLAC
NOVELTY FINISHES

•

IN STEP WITH THE TIMES

Industrial Finishes

that make the most of available raw materials to give you greatest durability, together with attractive appearance and economy.

• FOR APPLICATION BY ALL METHODS

JAMES B. DAY & CO., CHICAGO

ANOTHER WARTIME FINISHING HINT *from Du Pont*

PROPER TUC
CAN SPEE YO

Many rejects can become entirely serviceable pieces able to pass full inspection—by use of proper touch-up procedure. This will save the waste of manpower and materials involved in either junking the piece or refinishing it entirely. Such savings can be a big contribution today, when time presses us so sorely and America needs production *now!*

TRAIN MEN IN TOUCH-UP TECHNIQUE

The most efficient method of handling touch-up work is to train special men so they become proficient in this operation. This will speed every touch-up job and improve the quality of the work. Instead of "letting George do it," assign selected operators to touch-up duties so they become expert at preparing surfaces, priming, mixing and applying matching colors, and other steps in this process.

DU PONT
REG. U. S. PAT. OFF.

Better Things for Better Living . . . *Through Chemistry*

Send

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Handy poc
let, *"Hint*
shows 11
and speed

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Each bulle
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and details
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Write here
interested

TOUCH-UP PROCEDURE SEE YOUR WAR OUTPUT

MAIL THIS COUPON

Send today for Du Pont help . . . free information and service!

☐ *How to speed painting operations and save materials!*

Handy pocket-size, fully illustrated, 16-page booklet, *"Hints on Wartime Finishing Economies."* It shows 11 points to check for greater efficiency and speed in wartime finishing.

☐ *Bulletins on Government-Specification Paints!*

Each bulletin covers specifications for a particular branch of the armed forces. Includes color chips and details on application, drying time and other factors for establishing production schedules. Write here the government contract items you are interested in finishing:

☐ *How to meet emergencies and solve finishing problems*

Du Pont has a staff of skilled Service Engineers, or "trouble-shooters," ready to help you . . . straighten out "kinks" in your finishing processes . . . locate trouble before it bothers you . . . or take care of it quickly when it arises. They have the "know-how" gained from experience with the finishing problems of many industries. They're ready to serve you on war-contract finishing. Write about your problem. Or wire in case of emergency.

NAME_____

FIRM_____

STREET NO._____

CITY_____ STATE_____

Send this coupon to: **E. I. du Pont de Nemours & Co. (Inc.)**
7146-D Du Pont Building, Wilmington, Del.

(This coupon good only in the U. S. A.)

APPROVED IN PRODUCTION

Specialists?
Yes!

SPEED THE WAR EFFORT WITH APPROVED FINISHES

We have turned idle plants, caused by finishing troubles, into full production with approved and tested finishing materials, through research and practical experience. Let us produce a finish that meets Government Specifications PLUS, adapted to your present production methods. IT CAN BE DONE!

Developments We Are Proud of—ALL FIRSTS

No. 1080 Water Can Interior Coating developed for QM Spec. No. 111 — APPROVED IN PRODUCTION.

No. 60 Clear and Pigmented Water and Gasoline Can Coating developed for Marine, Navy, Army and Lend-Lease — APPROVED IN PRODUCTION.

No. 425 Black Enamel for Personal Hardware applied in production and approved by QM Laboratories — APPROVED IN PRODUCTION.

No. H 75 Sealing Seam Compounds for troublesome double seaming operations — APPROVED IN PRODUCTION.

No. 5-622-AXS-684 One Coat Dipping or Spraying on bomb fins and ammunition, etc. — APPROVED IN PRODUCTION.

AXS 736 Clear Shell Coating, dip or spray — AND MANY MORE TOO NUMEROUS TO MENTION.

GOVERNMENT SPECIFICATIONS IN PRODUCTION — Zinc Chromate Primers; Holabird, Maritime, Naval Ordnance, QM Corps, Marine Specifications.

We've Helped a Score of Concerns with Their War Production Finishing Problems. We Can Help You, Too! Write us.

THE SCHAEFER VARNISH COMPANY
Incorporated
LOUISVILLE — — KENTUCKY

What We Did in 1942

BY A FOREMAN FINISHER

I AM SINCERELY thankful that 1942 has passed. I believe that practically every finishing foreman and superintendent in the United States will either consciously or subconsciously echo this same thought. The year 1942—with its finishing material shortages which necessitated hurried and almost untried substitutions of less vital materials; with its labor shortages due to the induction and enlistment of the younger men into the nation's armed forces—gave production foremen plenty of problems. It was an era of record-smashing production. Yes, 1942 has passed, praise the Lord, but as for 1943, just pass along the ammunition to us finishers!

The conservation of materials and labor in our finishing rooms will be no small factor in our country's mighty war production effort. The speed with which this country equips itself and the final cost of armament to its taxpayers will be determined, in no small part by the supervisors who control this branch of industry. Materials saved are materials saved for war offense, and labor saved by improved methods is labor saved for the war effort. Finishers have carried their share of the burden in the past and they will continue to do so in the future, make no mistake about that.

Passing of the old year usually sets a man to thinking about just what he has accomplished in the year gone by, and what he hopes to accomplish during each precious day of the coming year. The war makes it even more imperative for every finishing foreman to examine his record of the year's achievements in production, costs and labor turnover. That's what I shall do:

Production and Labor Turnover

My department's production has increased 250% during the past year. At the same time my crew has increased only about 75%. At the start of the year only 80 people were under my supervision, just six of them girls. Today only 17 of the original 80 are still working in my department, but 100 of those now working are girls. It was no snap, breaking in over 100 new employes and increasing production 2½ times, but I kept my feet on the ground and my head out of the clouds by telling myself that almost all other finishing-room supervisors throughout the country were confronted with the same problems.

Many new methods had to be developed. A lot of items that formerly were sprayed were changed over to dipping, which proved to be faster. Conveyor cars were

strengthened in order that double the usual load could be placed on each car, doubling capacity and reducing handling at the same time. New finishes were worked out wherein two coats took the place of three. Likewise, two coats were replaced by one. This reduction in the number of coats went into effect on units and parts of units in such a manner that their quality was not impaired. All in all, I believe that this phase of the year's accomplishments were well taken care of.

Development of New Materials

Observing the rapid trend toward paint material shortages, we began, well over a year ago, the development of replacement materials, working in close cooperation with our paint suppliers. When tung-oil type varnishes became almost unobtainable and prohibitive in price, we had already changed over to castor-oil type varnishes. Although these worked out well in spraying, we encountered many troubles when we tried to use them for dipping. Our paint supplier worked closely with us, however, and eventually we licked those problems.

In place of the old fashioned wiping stain, sealer or shellac, and varnishes, we now use a sealer-stain and varnish only. We eliminated the wiping and staining operations by spraying both stain and sealer in one operation. We cut our labor almost in half, obviated the use of shellac, and saved one third of the materials formerly used. The total savings by this changeover amounted to 33 cents out of every dollar spent for material, labor and overhead.

Where we formerly had used a coat of primer and a coat of enamel on several parts that did not show very much, our paint supplier worked out a lacquer enamel which we used to cover moulded and planed parts in one coat. This resulted in a finished product which was equally as good as what we formerly obtained with two coats. We were able to refill our lines three times daily, increasing production 300% and saving 50% of the former cost.

These three illustrations are but a few of many we worked out. None of them could possibly have been worked out without extremely close cooperation between paint supplier and user.

A Challenge Accepted

War production and essential civilian goods production are America's second line in the war effort. The protective coatings phase offers a challenge to its workers, especially to the supervisors and engineers. We must accept this challenge and will practice every conceivable bit of ingenuity at our command to entrench finishing supervisors, in both the supply and user branches, as leaders in all industries of America's second line of defense.

Hand Pumps Useful

THE USE of hand pumps for dispensing finishing materials of different kinds from drums has been found convenient in many cases. Materials can also be drawn from tanks or vats with the same type of tool. Hand pumps by some manufacturers, are available in capacities ranging anywhere from 7 to 25 gallons per minute. One line of hand pumps, which has come to my atttention, includes 54 standard models.— E. C. M.

Beauty is admired . . . wherever you find it

If you are making products for civilian use, beauty of finish is very essential in establishing consumer acceptance. Finishing materials that meet these requirements, and provide a protective coating as well, are now available in qualities equal to or superior to those formerly furnished.

In case you are manufacturing war products we are meeting U. S. Government specifications with protective coatings that are standing up under the toughest conditions imaginable.

Write us about your requirements. Your inquiry will receive prompt action.

NO TAMPERING WITH QUALITY

ROCKFORD VARNISH COMPANY

Manufacturers of Protective and Decorative Coatings

ROCKFORD, ILLINOIS

Here is my article on the Finishing of Aluminum Castings. I hope that it will be of some use to you. Not knowing how lengthy an article you wanted, I didn't go into much detail on that account.—

J. S. Dunkin,
Paint Foreman

HOW WE SOLVED THE PROBLEM OF FINISHING

Aluminum Castings

BY J. S. DUNKIN

IN THESE war times most manufacturers have had to change their entire plant in a very short time and, in most cases, retool completely in order to do a job that is not only new to them but new to the manufacturing field.

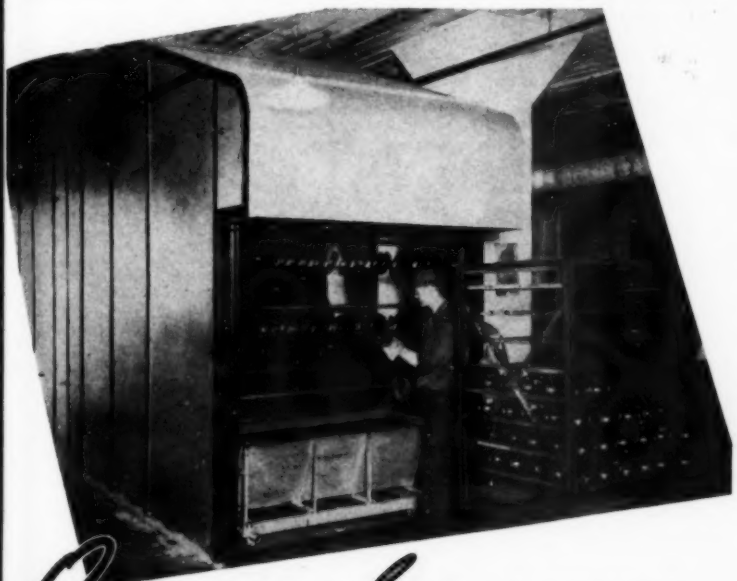
This company is no exception. Like other companies, we have our problems. Our latest problem, in the paint department, was the finishing of aluminum castings which had to be machined to a very close tolerance. Heavy aluminum castings are naturally porous and in the process of machining they would pick up cutting oils and coolants, which would get trapped in the pores of the metal. The cleaning process we adopted was as follows:

1) Vapor degreasing through our vapor machines.
2) Hot water rinse.
3) An alkaline rinse.
4) Hot water rinse again.
5) 10% chromic acid rinse.
6) Another hot water rinse.

In spite of this long process, after priming with zinc chromate, these trapped oils would become free and ooze through the primer, causing loss of adhesion and bare spots. We experimented with infra-red lamps and attained a minimum of satisfaction.

In pre-heating the castings, before applying zinc chromate primer, the idea was to expand the metal and at the same time break down the trapped oils. Then, upon cooling, the natural contraction of the metal would squeeze or pump the oil out of the pores. Of course this entailed an additional cleaning operation in washing off the oil with a naphtha solvent.

However, on further study we discovered that a minor change in the machining process, plus a change from the use of mineral cutting oil to a high-solvency vegetable oil helped remarkably in



One man alone OPERATES THIS FINISH BAKING SYSTEM

With the growing manpower shortage, this Despatch Continuous Conveyor Finish Baking Oven fills a definite war time need.

Just as this oven, operated by one man alone, handles tons of small electric motor parts which formerly required three or four men, so can thousands of ordnance items be processed with equal ease.

Despatch offers you 108 standard models to choose from, and prompt quotations are assured on special requirements. Phone, wire, or write today for your local Despatch engineer to help you with your finish baking problems. Ask him for interesting bulletin No. 51.

Prompt deliveries get you in production faster

DESPATCH
OVEN COMPANY MINNEAPOLIS

solving our problem. By anodizing all aluminum castings instead of using the chromic acid dip we were able to eliminate the pre-heating operation and secure a better adhesion of the primer, which gives us a far better and more durable lacquer finish. Time saved means quite a lot to most manufacturers. On some parts this new procedure saved from 40 minutes to 1½ hours in the paint department alone.

In the application of zinc chromate primer (Specification AN-TT-P-656) to aluminum castings, when it is to act as an undercoat for nitrocellulose lacquers, the thinning or reducing of the zinc chromate primer is very important. This is really a major factor in the ability of the final finish being able to take rough treatment.

What We Use as a Substitute for Toluol

Prior to January of this year, the painting industry had unlimited quantities of toluol. Incidentally, toluol is one of the best thinners for zinc chromate primer. Since toluol is vital to the manufacturers of explosives, the WPB allocated it for that purpose.

I am now using a thinner of my own formulation which consists of 92% xylol and 8% cyclo-hexanol.* Personally, I prefer this formula to toluol. Anyone in need of a thinner as a substitute for toluol, will find this formula satisfactory.

I maintain our primer at a viscosity of 29 seconds, using a No. 1 Zahn viscosity cup, and I apply the primer very light. We use a well-known make of spray gun, with suitable fluid tip and air cap. I keep my air pressure at 30 to 35 lbs. on the guns and 5 lbs. on the paint tanks.

Infra-Red Drying

I force-dry the primer at a temperature of 165° F., for 1½ hours, by using infra-red drying lights. This method of drying is equivalent to approximately 10½ hours of air drying.

After the castings have been air cooled, the color coat of lacquer is applied and permitted up to 30 minutes of drying time by the infra-red lamps, at a temperature of 165° F.

In a few words, an absolutely clean surface plus a thin coat of zinc chromate primer and an adequate drying time will solve the majority of metal painting problems where the adhesion is poor.

Bitumastic Paints

WE HAVE it on good authority that there have been few if any restrictions placed on protective coatings prepared from coal-tar pitch bases, for use on outdoor machinery and other steel equipment. It follows that no changes have been forced in their formulas, and since no primer is required in using them, the production line is often speeded up by their use. One firm that supplies a line of such coatings, which they are pleased to call "Bitumastic Blacks", claims that they offer long protection against the most severe corrosive conditions.—A. W.

*In reference to xylol and cyclo-hexanol, they are now on the priority list, although at the time the formula in discussion was formulated they were not. I understand that to secure these solvents, one would file a requisition with the War Production Board one month in advance. Anyone using zinc chromate primer has sufficient priority rating to obtain xylol and cyclo-hexanol.

TAKE ordinary chicken wire. Tuft it deftly with glass fibers or steel wool, dip in green paint, and you have an ingenious and effective device for the camouflage of field piece or anti-aircraft gun. But ordinary paint tends to burn or char in the gun's fiery blast. So the manufacturers have turned to fire-retardant Arco Infray—with great success!

Infray—the infra-red reflecting camouflage paint—is only one example of the many times proven ability of the Arco Research Laboratories to meet specific needs with specialized products, tailored to fit. Those Laboratories are at your disposal, without obligation, to help you find the solution for any problem paint can solve. Your inquiry will be handled without delay.

War Paints for Industry **THE ARCO COMPANY**
CLEVELAND, OHIO · LOS ANGELES, CALIFORNIA

Spraying Light Sheet Metal Parts

HAVING no dipping facilities or conveyor system, we were forced to find some other means of coating, with zinc chromate primer, a lot of airplane parts made of alclad. These parts were too light to be sprayed while lying on any flat surface, due to the fact tthat air pressure from the spray gun would blow them off on the floor or blow them together, making a mess of the coating. We could not wait on equipment, so here is how we mastered the problem:

For experimental purposes I made a wood table (without a top). It was 36-in. square and 32-in. high, with a caster at the end of each of its four legs, so we could move it around easily. Then I had a single open metal frame made large enough to fit loosely over the top of the wood table frame. The metal frame was about 1-in. oversize all around so that it could be easily and quickly positioned over the table, and then removed just as easily and quickly. Over this metal frame I stretched a piece of ½-in. wire mesh screen. It was fastened securely on all four sides. To reinforce it, so the screen would not sag in the middle I stretched a heavy wire from one side to the other and fastened it to the frame. This

In the plant of a large mid-west aircraft manufacturer, there was recently installed what is probably the world's largest 3-deck spray booth. It is 150-ft. long, and over 30-ft. high. Three sets of water curtains, one above the other, wash the air and carry out the fumes and overspray from the painting operation.

Illustrated above is the equipment room, which houses all motors, starters, blowers and pumps necessary for the operation of the 3-tier spray booth illustrated at left. Photographs, courtesy of Binks Mfg. Co.

TOTEM POLES
AND
TEA TABLES

Whether finished in brilliant colors or crystal clear, the most rugged figures and the most delicate grains have all had finishing tests in the Nason laboratories.

Varied are the problems presented daily to the Nason staff of laboratory technicians. They have perfected finishes for practically every known surface.

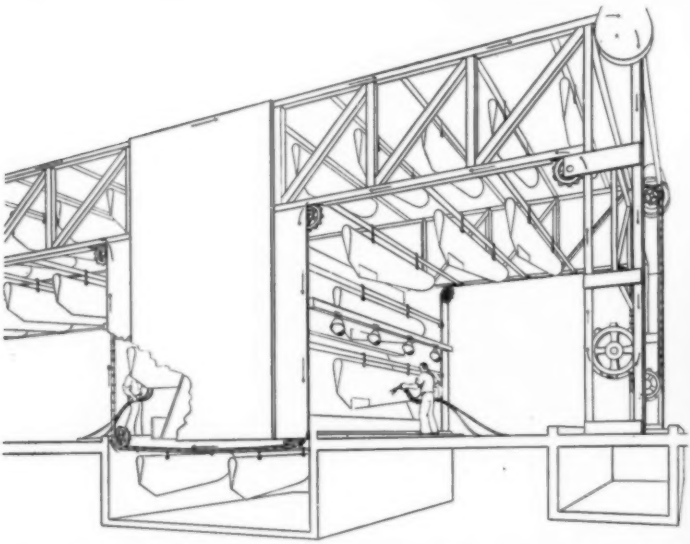
That's why there is no guesswork in the Nason formula for the finish on your product. It has been tested, it has been tried and it is ready.

Remember, no matter how small your finishing problem is, it receives major consideration from the Nason chemists.

R. N. NASON & CO.
manufacturers
PAINTS • VARNISHES • LACQUERS

NASON *fine finishes*

151 POTRERO AVENUE, SAN FRANCISCO • 2201 BARRANCA STREET, LOS ANGELES



This diagram shows part of the conveyor system and two water-wash spray booths (positioned back to back) as installed for spraying airplane wings in the plant of Fleetwings, Inc., Bristol, Penna. Advantages of the equipment are obvious. It facilitates streamlined rapid production, allowing operators to remain at the stations where they spray under ideal conditions. After the wings are sprayed on both sides, they travel forward and double back at a higher level, during which time the coatings dry quickly and thoroughly. Information supplied by courtesy of The Fleetwings' Arrow.

½-in. wire mesh top was then placed on the table frame, so I had a table with a ½-in. wire mesh top.

The pieces of light sheet metal were laid on this screen and sprayed without any difficulty. The table was small enough to move into and out of the spray booth. When a table load of pieces were sprayed on one side we moved the table a few feet from the spray booth and positioned it under a flow of warm air from a heater. In from three to four minutes the parts were dry to handle, so they could be turned over and sprayed on the other side and again moved under the warm air to dry. Within a few minutes they were placed in containers and delivered to the assembly department.

This mesh-wire table top worked so well that I had several of them made. By using two people at the spray job, several hundred parts could be sprayed in an hour and dried ready for assembly.

Zinc chromate primer dries in from seven to ten minutes, under normal room temperature conditions, but if heat is applied it can be dried to handle in from three to four minutes.

YOU'LL BE DELIGHTED WITH THIS TEN FEATURE FINISH!

EGYPTIAN LUSTRELESS BLACK BAKING ENAMEL Meets All Requirements of Quartermaster Spec. JQD-144.

This superb new coating for Equipment Hardware made of ferrous or zinc alloy metals offers manufacturers the following ten required features:

1. Resistance to Accelerated Weathering. 2. Resistance to Salt Spray. 3. Resistance to De-Lousing. 4. Resistance to Chemicals. 5. Resistance to Cold. 6. Resistance to Boiling Water. 7. Resistance to Petroleum Solvents. 8. Resistance to Abrasion. 9. Flexible—(Will not readily chip, check, or flake.) 10. Completely lustreless.

Note especially the lack-lustre (dull) finish—comparative tests invited. EGYPTIAN meets all resistance requirements with a lustreless finish—a difficult laboratory achievement.

Send for Government "Spec." Book

These are a few of the more important Government "Spec." finishes which we can furnish. For more complete list send for "Spec." book.

ES-681
Synthetic Type
Protective Coating
★ JQD-144
Lustreless
Black Baking Enamel
AXS-126
Clear Finish
for Steel Cartridge Cases
AXS-680
Lustreless Lacquer Enamel
for Ammunition
AXS-684
Type I and II
Lustreless Paint
for Ammunition
3-162-A
Nitrocellulose Lacquer Enamel
for Ammunition
P-27-b-2
Zinc Chromate Primer
84
Zinc Chromate Primer
AN-TT-P-656
Zinc Chromate Primer
PXS-979
Lacquer Enamel
for Ammunition
(Cellulose Type)

THE EGYPTIAN LACQUER MANUFACTURING CO.
Rockefeller Center, New York, N. Y.

EGYPTIAN FINISHES

EGYPTIAN
Superior **FINISHES**

The removable wire mesh tops can be used a long time before they need to be cleaned. To clean them we turned them upside down on the concrete floor, held a solid block of wood against the screen, and hit it repeatedly with a hammer. The paint would crack and break and fly off the screen. It can be swept up after the screen has been cleaned.—F. HAGAN.

Clean Air for Finishing

WE ALL want clean air in the finishing room. We are not so particular how we get it—just so we get it. There are a number of different methods by which it is done. One of these, perhaps as simple and practical as any, consists of drawing air into the room through filters. Some firms make it a business to supply air filters for this purpose.

Electrical precipitation of dust is finding its way into general industrial use, and this could be profitably applied in many cases where finishing rooms are directly concerned. The original electrical precipitators were used for separating and precipitating fine particles of ore from the gases arising from metal ore smelters.

The principle involves the passing of air or gases through vertical metal tubes, in the center of which an iron chain is suspended and held taut by a weight attached to the bottom. The chain forms an electrode. Particles in the gases that move through the tube are charged by the chain electrode and are forced by repulsion into contact with the walls of the tube, where they collect and cling. In some cases, horizontal units have been developed, but the principle is about the same. Direct current must be used. Provision is made for removing the collected dust periodically, or in some cases it drops into a hopper from its own accumulated weight.

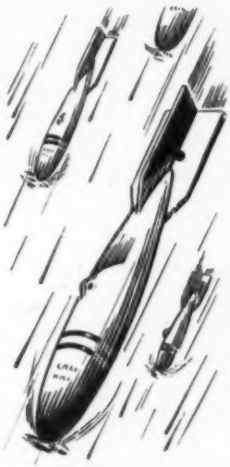
A modern variation of the idea just mentioned is incorporated in a precipitator cabinet which uses a vacuum-tube power pack directly attached to the cabinet to produce the necessary electrical charge. It can be designed for efficiencies as high as 99% by weight, including removal of particles as small as one-fifth micron.

Some air-conditioning engineers have gone to great lengths in the matter of dust collection from air. Regardless of how peculiar a given problem may appear to be, they can be depended on to recommend the correct type of equipment for dust removal in that particular place. One firm that I know of, has a Dust Research Laboratory, where hundreds of different dust samples have been tested and studied. This particular firm makes dust collectors in various types, to fit different conditions found arising over the industrial field.

Lays Three Stripes

THREE striping wheels on a modern striping tool to lay down three parallel lines at once, and every one laid down positively, even though the surface to which the stripes are being applied may be a bit uneven. How can that be done? By arranging the center wheel to "float". The center wheel is mounted on a floating axle, while the two outside wheels are on fixed axles. The body of the tool forms a reservoir for the striping fluid. It is one made by a manufacturer having long experience in the design and manufacture of paint-striping tools of mechanical type.

YOU CAN'T MISS WHEN YOU USE



Walker's

PROTECTIVE COATINGS

PRIMERS SURFACERS LACQUERS
WRINKLES SYNTHETICS

You can depend upon Walker's finishes, formulated as they are to customer's exact requirements, to satisfy in every respect. No near-hits or misses with Walker finishes. Try them on ordnance and munitions work or any exacting and difficult job that requires speed and uniformity.

"Call on Walker"

H. V. WALKER CO.
Elizabeth, New Jersey
MODERN PRODUCTION FINISHES

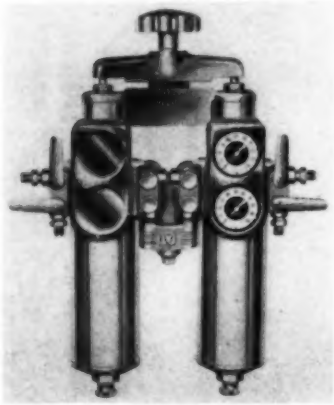
New Solvent Removes Salt and Oil

According to A. F. Curran, of The Curran Corp., Malden, Mass., Gunk P-96, concentrated self-emulsifying degreasing solvent has been found valuable for its ability to dissolve, emulsify and remove heavy accretions of bunker "C" fuel oil in the presence of salt water. The outstanding features of this new colloidal emulsifying solvent is that the degreased surfaces are particularly compatible for the application of red lead undercoat.

It is claimed that because of the powerful penetrating and emulsifying action, all traces of oil are made water-soluble and need only be sluiced with a water hose to rinse and decontaminate large areas such as the hold of warships.

Air Transformer for Heavy Service

The DeVilbiss Co., Toledo, Ohio, announces a new twin-cylinder air transformer that has a capacity of well over 100-c.f.m. In addition to this large capacity it has all of the important features which have made the single-tube Type HLC so completely satisfactory.



The new twin cylinder air transformer.

The two pressure regulators in this transformer, though both function independently, are simultaneously controlled by a single knob, making adjustment as quick, easy and positive as on the single-tube model. The filtering and condensing mechanisms are the permanent, all-metal type which never require replacement of any of their parts. The fast-acting regulator diaphragms are made of reinforced, oil-proof synthetic rubber and are chatter-proof.

Connection to the main air line is made at a single inlet port. No more fittings or piping are required than with single-tube models.

Each of the twin cylinders may be equipped with Type HOD Automatic Water Drains in the same manner as the single-tube Type HLC.

New . . .

MATERIALS
SUPPLIES
EQUIPMENT

Repair for Damaged Porcelain Enamel

Jo-Lar, a product of Johnson Products Co., 507 Fifth Ave., New York, N. Y., is a "Porcelain Renew" for quickly repairing chipped and damaged places on all porcelain enamel and vitreous enamel ware. It is put out in No. 1 and No. 2 types.

Jo-Lar No. 1 is a cement and filler. This is used to join broken pieces and to fill cavities and chipped places.

Jo-Lar No. 2 is a porcelain glaze. This is used to produce a perfectly smooth finish over the cement. The two types of Jo-Lar weld together into a solid piece of enamel. The repair

Are You MAKING THESE IMPORTANT WAR ITEMS *for Uncle Sam?*

DESKS — FILES — CHAIRS

No. 8383 Olive Green Stain
No. 8381 Olive Green Filler
No. 165 Sealer
No. 757 Gloss Lo-Vis-Lac
} Meets Air Corps specifications for Olive Green office chairs.

No. 547 Green Lacquer Stain Filler
No. 8367 Green Lacquer Primer
No. 8484 Olive Green Primer
No. 8929 Green Mar Proof Enamel
} Meets Air Corps specifications for filing cabinets, desks, and office equipment.

LOCKERS — CABINETS — BEDS

Spec. 61B Olive Drab Primer
Spec. 63B Neutral Gray Primer Sealer
Spec. 63B Olive Drab Gloss Enamel
Spec. 61B Olive Drab Enamel
} Meets Q. M. Corps specification 63B for bunk beds and 61B for foot lockers.

No. 165 Sealer
No. 8484 Olive Green Primer
No. 8758 Olive Green Enamel
} Meets Navy specifications for lockers and bunk beds.

No. 8484 Olive Drab Primer
No. 8964 Olive Drab Enamel, Color 22
No. 8762 Olive Drab Enamel, Color 8
} Meets Air Corps specifications for cabinets and lockers.

TRAILERS — TRUCKS — ORDNANCE

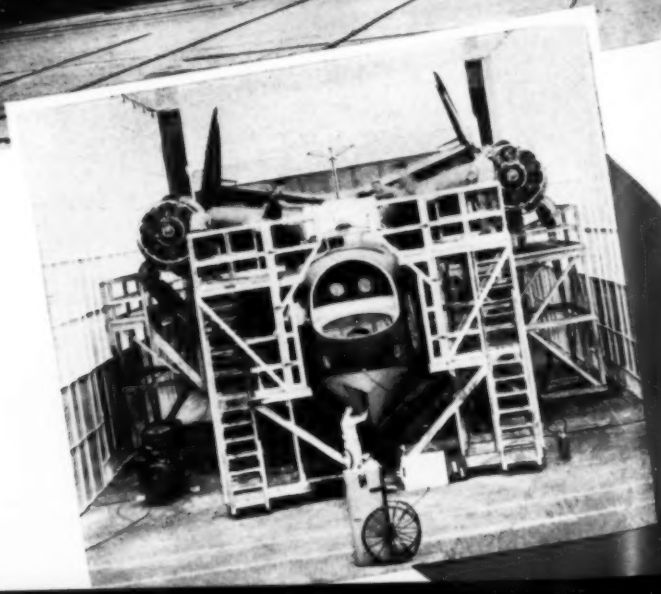
No. 407 Toxic Penetrex
No. 8110 Gray Refinishing Primer
No. 8965 Rust Inhibitive Primer
No. 8966 Lusterless O. D. Enamel
} Meets Q. M. specification ES-680 for trucks, trailers, ordnance and mobile equipment.

These materials have been officially tested and approved.

Send us samples of the wood you intend to use; mention which specification you must meet and whether you prefer lacquer or varnish; we will send you full details, samples and prices, WITHOUT OBLIGATION.

RELIANCE VARNISH CO., INC., LOUISVILLE, KY.

A Gigantic De Vilbiss



Vilbiss Spray Booth

SPEEDS THE PAINTING OF MARTIN BOMBERS

• This mammoth Water Wash Spray Booth—one of the largest in the world—is making possible faster and faster painting of huge bombers at The Glenn L. Martin Company plant.

With motorized partitions, its 15,200 square feet of floor space can be divided into four sections, each with two 16 foot water wash chambers. The huge fuselages move rapidly from section to section—progressively receiving their prime and finishing coats in mass production style.

DeVilbiss engineers designed this modern and efficient exhaust system to provide the uniform, effective movement of air for ideal working conditions. Yet its exhaust is so powerful that it removes and cleans 496,000 cubic feet of air per minute!

Just as DeVilbiss has helped step up painting operations for greater bomber output, so can they help you turn out more of your war product, too. Ask DeVilbiss about their wartime finishing record on a product like yours.

THE DEVILBISS COMPANY • TOLEDO, OHIO

Canadian Plant: WINDSOR, ONTARIO

DEVILBISS
SPRAY SYSTEMS

MR. STIX

The Manufacturers of The Four Famous Brands of

BURNING - IN - STIX

Announce

The Birth of Triplets

THE TRIPLETS

Special ENAMELSTIX—To be used in and under any type of enamels on wood. Will not lift under enamel finishes.

Special VARSTIX—To be used in and under any type of varnish on wood. Will not lift under varnish finishes.

Special SYNSTIX—To be used in and under synthetics and lacquer on wood. Will not lift under synthetics or lacquer finishes.

While there is an increasing demand for burning-in repair sticks, with special emphasis on defense and war applications, and despite the scarcity of gums, the same high standard of quality is maintained in the Seven Famous Brands of FINISHINE BURNING-IN-STIX. Do not hesitate to use ony one or all of these famous brands, but be sure that your supply is ample; anticipate your future needs and order ahead. There are burning-in-stix for every purpose. Special matching service free. Send us a panel and we will match it.

THE FAMOUS FOUR

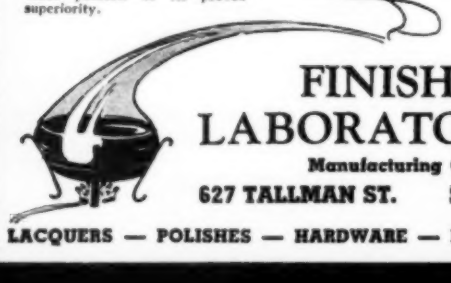
Special **Lacstix** is made of the finest materials, and will not lift or shrink in or under lacquer. Is free of color specks. Made of special resins that withstand the fast solvenizing action of high powered solvents used in modern synthetic and lacquer finishes. Helps finisher repair surface in one operation.

Special **Porcelstix** is the item you can depend upon to repair chipped porcelain, marble or tile. Does it within ten minutes. Easy to use and comes in assortment of fourteen permanent colors. Porcelstix is made from a unique combination of special resins that puts it in the high quality class. Is waterproof and will stand tremendous amount of heat.

Special **Shelstix** is made from the choicest shellac gums and resins, and will be found far superior to many brands of shellac sticks. If you haven't tried this Finishine SHELSTIX, you will be wise to put in an order right away, to make certain that your repair work will be of the highest grade.

Special **Cementstix** is made of more pure gum and colors than the average wood cement. Many customers using CEMENTSTIX with entire satisfaction. Your finishing repair stock is not complete without this item.

Send for a FREE TESTING SAMPLE of any of the above seven famous brands and convince yourself of its proven superiority.



FINISHINE LABORATORIES, Inc.

Manufacturing Chemists

627 TALLMAN ST. SYRACUSE, N. Y.

LACQUERS — POLISHES — HARDWARE — FURNITURE FINISHING SUPPLIES

coating does not crack, craze, check or shrink. It is proof against water, alcohol, gasoline and solutions of acid. It is available in white and tinted colors . . . does not fade or darken with age.

Oven Fans

High temperature acid-resistant fans of alloy steel—used on Despatch industrial furnaces and ovens for the past seven years—are now being offered to the trade for the first time by Despatch Oven Co., Minneapolis, Minn.

These fans are suited to virtually all heavy-duty high-volume requirements involving temperatures to 1600° F.

Acid-resistant high-temperature steel fans.

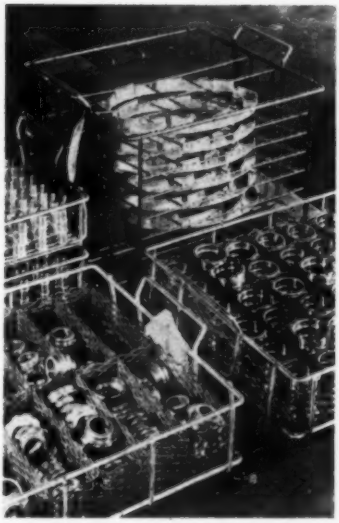
Their chief feature, in contrast to other fans of this type, is engineered design and construction, combined with precision-balancing. This assures unusual efficiency and smooth quiet operation under widely varying service and conditions, it is claimed.

Eleven sizes are available, ranging from 12-in. diameter wheels up to 48-in. wheels, handling total pressures to 10-in. W. G. Outlet can be arranged in 16 standard positions. Belt-drive (texrope) is used on all models, while wheel is overhung. Shaft is supported on two large air-cooled bearings. A patented device dissipates heat from the shaft before it reaches the bearings. Fan-wheel, shaft, etc., can be easily removed without disturbing housing.

Despatch fans are ruggedly constructed, being all-welded throughout. Pedestal, side and scroll sheets are heavy-gauge, and have strong reinforcing angles; other parts are equally tough and rigid to minimize vibration and withstand severe heat and load conditions.

Coating for Degreasing Baskets

A new coating for wire-transporting and degreasing baskets is now being manufactured by Resistoflex Corp., Belleville, N. J., and is already being used in the aircraft division of Packard Motor Car Co. Known as Resistoflex Solution, the new coating is a modified polyvinyl alcohol resin in solution form. Wire baskets can be

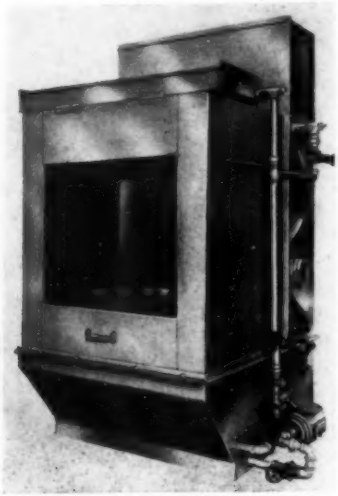


Industrial baskets coated with Resistoflex.

coated right in the shop by first dipping them and then passing them through a drying oven. The solution dries to a tough, resilient, solvent-proof, abrasion-resistant coating that will not tarnish or otherwise injure the most highly finished metal engine parts. Use of this coating permits employment of wire baskets, in which the contents are visible even when stacked, in place of less durable and convenient wooden boxes. The same solution is also used at Packard to coat workers' shoes that are constantly exposed to cutting oils and solvents which are injurious to the leather.

"Aqua-Restor" Paint Spray Booth

The accompanying illustration shows a single-compartment Aqua-Restor paint spray booth, featuring rear and side water-impingement walls. Aqua-Restor's "super-turbulent" water-washed walls, through continuous and effective pressure flow, provide unusual efficiency in spraying operations of all sizes and types. Employe health protection is assured, and fire hazards are reduced to a negligible minimum.



Single-compartment "Aqua-Restor" spray booth.

The makers of this equipment claim that the absence of spray nozzles eliminates the possibility of clogging; only low-power pumps are required. Also, they claim little servicing is needed, due to complete elimination of moving parts. Used water may be drained directly, or pumping can be arranged for distant disposal.

Units are now being used in many U. S. war production plants, and many users claim a high percentage of pigment reclamation. The unit illustrated here is equipped with turntable and fluorescent lighting. It is available in single or multiple units. Other sizes and designs can be engineered to meet specific industrial requirements. Bulletins are available upon request to Aqua-Restor Division, Mayer Mfg. Corp., 45 Division Place, Brooklyn, N. Y.

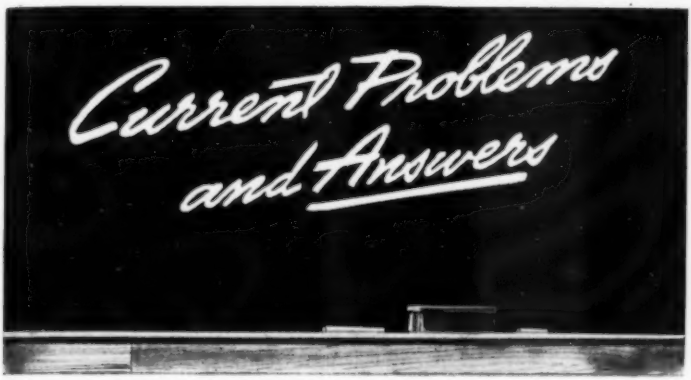
Portable Sandblasting Outfit

The matter of more speed being of vital consideration in all war production, Lieman Bros., Inc., Newark, N. J., offers portable blast equipment, as a complete set-up, all connected and ready to run.

While the outfit shown in the accompanying illustration can be used on most materials including metals, glass, plastics, wood or any composition, and on articles of nearly any shape or size, there are variations of the outfit to do the work of holding the articles or feeding them into the machine for rapid production, automatically. These outfits are made in a number of sizes to meet production demands of different manufacturers.

The outfits are of the self-feeding variety, wherein a small quantity of sand, flint, carborundum, or angular steel grit may be placed in service and, by being used over and over again continuously, it will last a long time.

The cabinet sandblast machine, as shown is limited in size, but any variation may be had to suit any type



Problem No. 1 Walls have ears... but Planes have Cameras!

We have learned in this war to conceal from the enemy not only what he can *hear*, but what he can *see* by aerial reconnaissance. The development of infra-red photography has made camouflage with ordinary paints and colors obsolete. Hence Government specifications of finishes having high infra-red reflectance. Your problem, as a finisher, is to meet these specifications with the production facilities available to you.

Here is the Answer

We can furnish you with the proper coating, compounded to exact Government specifications, and "tailor-made" to fit your shop conditions. Our laboratories are at your service in ironing out application problems and for testing results. We invite you to send specimens now for checking.

THE WATSON-STANDARD CO.
Manufacturers of
PAINTS . . . VARNISHES . . . INDUSTRIAL FINISHES AND LITHOGRAPH COATINGS

TOUCH JOB HEADQUARTERS
℞ Prescription Finishes
Give us your metal coating problem. We guarantee you an answer based on your conditions, and not just a standardized formula.

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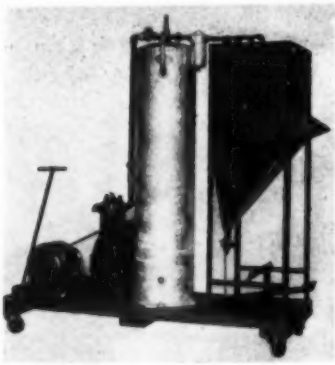


A complete portable sandblast outfit.

of work. Inquiries should be made by specifying the size and weight of the largest piece of work, the material of which it is made, the effect to be secured by sandblasting, and the quantity to be processed in an hour or any number of hours.

The outfit is complete and, being mounted on wheels, it can be moved from one place to another as occasion may require.

Flat Finish Coating In All Colors

An oleoresinous dead flat finish, available in any and all colors, is announced by Standard Varnish Works, Staten Island, N. Y. The material is identified as "905 Protective Coating"—a protective and decorative finish for metal, wood and similar surfaces. It can be air-dried or baked at a wide range of schedules. In air drying it sets to touch in two or three minutes, and sets to handle in five to ten minutes.

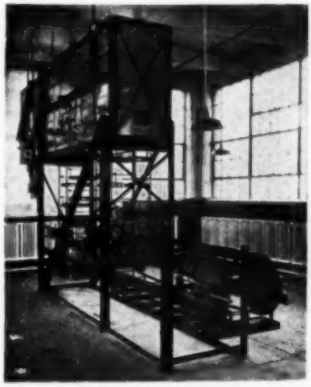
No. 905 reduces 50/50 with VMP naphtha and it can be applied by spraying or dipping. Coverage varies according to method of application but generally it amounts to 400 to 500-sq. ft. per reduced gallon.

According to the manufacturer, No. 905 has been accepted by the U. S. Government for many production items. It has numerous military and civilian uses. It shows excellent adhesion, abrasion, water, salt spray and weather resistance. Rapidity of drying lends itself to high speed production. In proper colors it meets U. S. Army Ordnance specification AXS-684, paint for ammunition.

Coats Bomb Fuses

The equipment shown in the accompanying illustration is designed for dip coating and surface drying bomb fuses and small items of similar character. The cycle of operations is as follows:

Removable baskets filled with bomb fuses are carried by a conveyor through a pre-heating zone, then downward into a dip tank containing lacquer, through a shaker to remove excess lacquer, up again to pass through a drying zone, and finally down to the horizontal section of the conveyor where unloading and loading takes place. Each basket holds 50 to 200 work pieces of various sizes. Pre-heating is at 180° F. for a period of six minutes.



Occupies small space but has large output.

Movement in 2-pass arrangement

SEND FOR THIS FOLDER ON PLYWOOD FINISHES

TUF-ON FINISHES INCLUDE

a full line of Exterior and Interior Finishes for air and forced drying in aluminum, clear and color and their undercoatings and seam, dent and crack filling compounds.

INDUSTRIAL RESEARCH DIVISION
WIPE-ON CORPORATION, 105 HUDSON STREET, NEW YORK

through the drying zone requires 15 minutes at 212° F. Production is at the rate of 10,000 fuse anvils, bodies and screw plugs in an 8-hour shift. The equipment occupies a floor space measuring 3x20-ft. Overall height is 11-ft. Heat is supplied by gas-fired equipment. It is a product of the Lanley Co., 750 Prospect St., Cleveland, Ohio.

Respirator Redesigned

In order to save metal for war production, the M. S. A. Comfo dust respirator has been redesigned with filter cases of black plastic, according to the manufacturer, Mine Safety Appliances Co., Braddock, Thomas and Meade St., Pittsburgh, Penna. This well-known respirator now offers better appearance plus less resistance to air flow. The new filter container units are thinner, with rounded edges, permitting even better sidewise and downward vision.

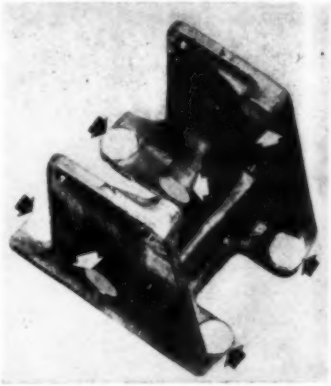
The re-designed plastic filter cases have high impact strength with no electrical conductivity. They are not affected by perspiration.

Retaining every Comfo advantage of safety and comfort in dust protection, the field-proved plastic model has twin side-placed replaceable filters of unusually large area. The unit is easy to clean and maintain, and is available in types to meet various dust and mist conditions.

Masking Stickers

A new method of masking has been developed which is particularly effective when the area to be masked is small. Kum-Kleen stickers, which have a self-adhesive backing and may be easily peeled off afterward, have been found to be effective for this purpose. They are quickly applied, without moistening, to metal, glass, plastic, wood or any smooth surface. They will not pop off even under intense heat, yet they can be peeled off easily without tearing or scraping.

While standard sizes of Kum-Kleen labels will fit many normal masking



Arrows show surface masked with stickers.

jobs, special sizes and shapes are made to specifications. Much time is saved by having a mask cut to the exact requirements.

The Avery Adhesives, manufacturers of Kum-Kleen labels, are located at 451 E. 3rd St., Los Angeles, Calif.

Dresinate Helps Clean Metal

Dresinate, the neutral sodium salt of selected rosins, is available in several types, each made to strict physical and chemical specifications. Rosin, used for years in alkaline cleaning baths, was not entirely satisfactory because of failure to saponify completely under the usual conditions of service. This incomplete saponification interfered with clear rinsing, because particles of rosin would cling to the metal surface.

Dresinate is so made as to have no free rosin content, and each particle of the product is completely water-soluble. Being a dry, free-flowing powder, it goes into solution quickly.

When properly used in connection with caustic, Dresinate produces rapid wetting of surfaces — emulsifies oils, greases and other types of dirt remov-

WITH THE WAR JOBS—

Hilo Protective Coatings Are at Work

HILO

1. ***Air Forces***
   Rip-pls, Zinc Chromate Primers and Synthetic Aircraft Enamels.
2. ***Shipping***
   Exterior and Interior Paints made to Specifications of the Maritime Commission and the Navy.
3. ***Ordnance***
   Lacquers for Ammunition, Acidproof Blacks, Finishes for Fighting Tools.
4. ***Chemical Warfare***
   Enamels and Lacquers for Specific purposes.
5. ***Corps of Engineers***
   Camouflage Paints.
6. ***These and Many Others***
   That fit various methods of application and process of drying.

Prompt attention will be given to your needs. Bring them to us or ask that a Hilo Technical Representative call.

HILO VARNISH CORPORATION

Established 1863

42-60 Stewart Ave.
BROOKLYN, N. Y.

2420 Washburne Ave.
Chicago, Ill.

Park Square Building
Boston, Mass.

able with alkaline cleaners—and maintains the soil in suspension to assure thorough rinsing action.

Dresinate can be mixed with the dry alkalies, or may be added directly to the alkaline cleaning bath (fresh or used) in which it readily dissolves. It is equally effective in strongly alkaline baths, such as are used on hard-to-clean iron and steel parts, or in weak alkaline baths formulated to clean soft metals such as aluminum and brass, where strong alkalies cannot be used. Dresinate itself has no chemical action on soft metals, thus in combination with the proper alkalies it can be relied on for safe as well as thorough cleaning.

In alkaline metal-cleaning baths, Dresinate develops two important assisting actions—rapid wetting of the metal surface coupled with emulsification of oils, greases, etc.—and dispersion of these soils into stable relatively permanent dispensions which can be quickly rinsed away to leave a clean surface fully prepared for further treatment. This material is a product of Hercules Powder Co., Industrial Chemical Div., Wilmington, Dela.

Chemical Powder Eliminates Damp Air

To end damage caused by excessive humidity and condensation (such damage as rust, mold, mildew, warping) and prevent musty odors has long been an accomplishment of Tamms Silica Co. of Chicago, Ill., makers of Dri-Air Chemical Powder. Now, regardless of metal curtailments in the production of Dri-Air containers, two new units of non-essential materials are being placed on the market. One of these, known as a commercial tripod unit, is designed for warehouse, factory, and general store use.

The unit has a sturdy, special treated tripod under which 10-lbs. of Dri-Air powder can be suspended in a mesh bag. Drippings from moisture absorbed by the Dri-Air powder are collected in the user's own bucket or pan. It is adequate for removing excess moisture from 1000 to 1200-cu.ft. of air.

Letters from I. F. Readers

(Continued from page 8)

from whom I might obtain any information on this subject?

We are anticipating the loss of two or three of our boys to the armed forces, and one of them is at present handling the tumbling departmtent. I will have to help out in that department. Any information you might forward to me will be greatly appreciated.—J. W. N.

We are sending you a reprint of some articles published on this subject in past issues of INDUSTRIAL FINISHING.—ED.

Pyroxylin-Coated Fiber Board

We note in INDUSTRIAL FINISHING for Nov. 1942 (page 7) that you have someone interested in pyroxylin-coated fiber-board. Please give us the name and address of this company, as we feel that we may have something which will be of interest to them.—The Traco Division of M. A. Ferst, Ltd.

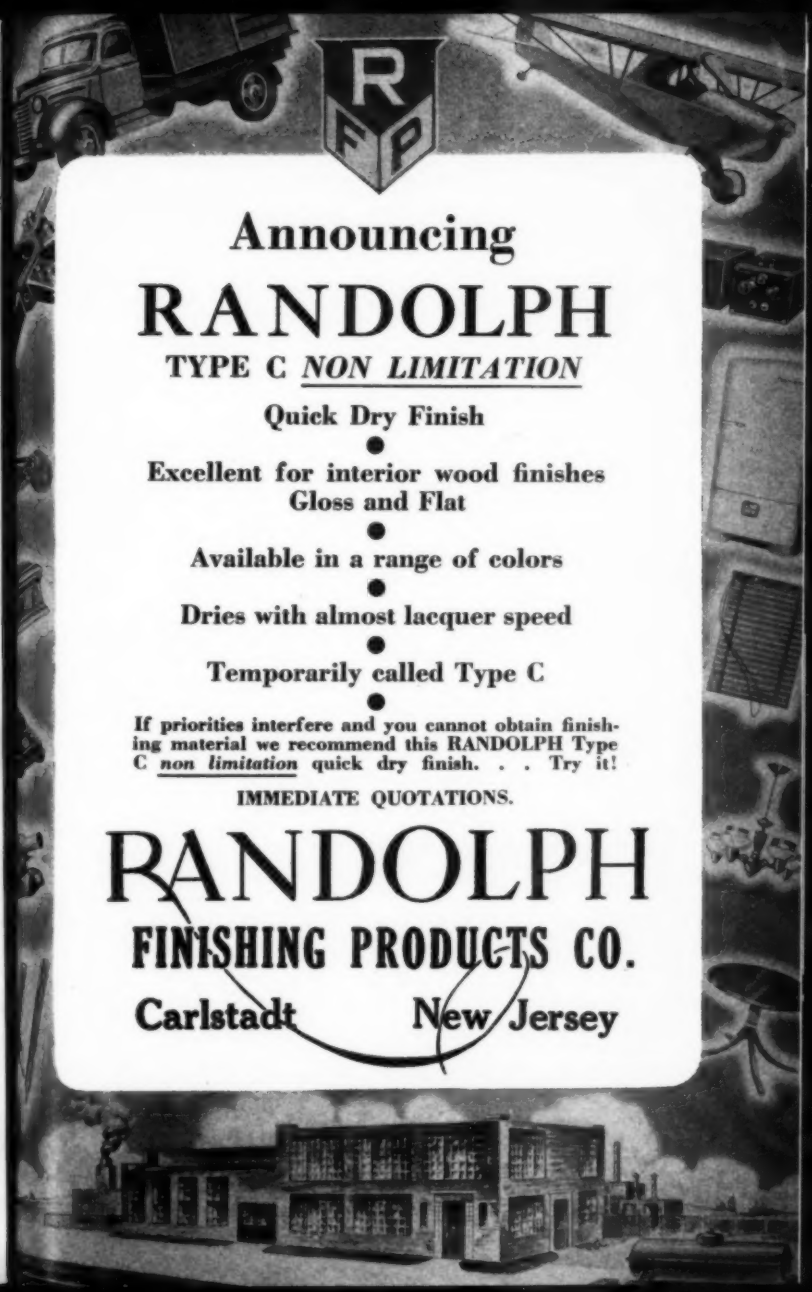
Fire-Resisting Paint

We are interested in an inquiry from the W. Co., in November issue (page 4) for a fire-resisting paint. We have had considerable experience in the development and manufacture of fire-resisting paints and sealers, and at present are supplying several war contractors with our material. Probably we could be of assistance to the W. Co. and we will appreciate your putting us in touch with them.—Benjamin Foster Co.

Composition Ornaments

In Nov. 1942 issue, "Letters from Readers", I noticed where several readers are interested in a "compo" formula used in making ornaments. I have such a formula which has been used for years and has given satisfactory results. If you will forward this letter to your readers, I will be glad to write them direct.—C. H. Cooper.

We question very much whether H. R. would care to invest the capital involved to set up equipment for making his own composition ornaments. Special machinery of various sorts, in conjunction with rather a complicated process, is involved. Under the circumstances it is only fair to advise him of these facts. He wouldn't go in for making his own finishing materials, furniture, jewelry, clothing, etc., would he?—S.


R
F
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Announcing
RANDOLPH
TYPE C NON LIMITATION
Quick Dry Finish
Excellent for interior wood finishes
Gloss and Flat
Available in a range of colors
Dries with almost lacquer speed
Temporarily called Type C
If priorities interfere and you cannot obtain finishing material we recommend this RANDOLPH Type C non limitation quick dry finish. . . Try it!
IMMEDIATE QUOTATIONS.
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Carlstadt New Jersey

Efficiency in the Finishing Room

THE efficiency of a finishing department depends upon its location, proper air conditions, plenty of daylight, the right sort of workmen, and equipment suitable for the kind of work to be done. Also, it is important to use the proper materials, selected by an expert finishing foreman who knows just where to apply them, and how.

In order to get satisfactory results from a department so equipped, it is absolutely necessary to have a foreman finisher who is up to the minute on his colors and finishes at all times. A foreman who has the idea that he is about the only one who can run his department—and has got to the point where he is no longer interested in new ideas that are coming along all the time—is not the type of man to have on the job. He is not giving his company full efficiency.

On the other hand, a foreman who is on his toes and hasn't the idea that he is about all there is in the world—he gets by much easier and is more uptodate. He is always looking for someone to come along with some new idea, and he is ready at all times to give it a trial. Right at this time is a good place to give an illustration.

At the time spray equipment was in its infancy, when all brush hands were in full swing, it was difficult to interest either the manufacturer or the workmen in the fact that a great change-over to spray application was about to be made. After it had been proved that spray equipment could do the work to such a degree of improved efficiency over the old type of of brushing, then practical men realized the spray system offered one of the greatest transformations ever made in the progress of production finishing departments.

Many kinds of efficiency problems have come up at various times. I will relate one of these. It happened in a phonograph cabinet plant where production was at its highest peak. In fact things had progressed to the point where even the manager of the plant could not handle the many problems that were coming up. He lost confidence in his whole organization. He thought that by getting an outside efficiency group to put him over, his trouble would vanish. This was one of the biggest mistakes he ever made. He turned down the organization that he had built and turned to this new group to save him from destruction. Naturally, this caused some ill-feeling among key men in the organization. They lost confidence in themselves.

A piece-work system had been installed and was working perfectly, as to proper rates set, etc. The efficiency group immediately started to tear it down and install what they claimed would be a more efficient system. The finishing foreman tried to work with this group in solving various problems, but these new fellows were not practical men. They were just "figure" heads. They broke down the system that had taken years to install.

One of these men would step up to an operator—a man sanding, for instance—and tell the operator to get going at his highest speed, as he was going to time him for a change in rate setting. Naturally the operator, having some intelligence and self interest, would gauge his speed to where he knew the rate could not be changed to less than what already prevailed.

An Outstanding — Shellac Replacement Product

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Here's a product that has all the desirable qualities of Shellac.

It is a development of our laboratory and has been thoroughly tested over a long period.

Has extremely high resistance to water — Thins with alcohol — Dries fast and hard — Sands easily.

A generous working sample will be sent FREE on request. Write today.

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NEW YORK WOODFINISHERS' SUPPLY CO., INC.

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Established 1917

FLOCKS

COTTON
WOOL
RAYON

for **NOVEL APPEARANCE**
IMPROVING YOUR PRODUCT
INCREASING YOUR SALES

The application of Flocks to any object is a simple matter. The added beauty and utility obtained are a stimulus to sales and profits. You ought to look into flock finish for 1943.

Write for color card and samples.

CLAREMONT WASTE MFG. COMPANY

CLAREMONT, N. H.

The country's largest mfrs. of Cotton, Wool and Rayon Flocks

Accordingly, the man doing the timing with his stop watch and slide rule was outwitted, as he knew nothing of the operation himself. Instead of getting the foreman's confidence and having the foreman work with him on these operations, he just took it upon himself to go ahead and try to bulldoze things out.

Other cases appeared which showed that these same efficiency experts were impractical. Entering the filling room, the expert would look over the department and pick out one operation. In one instance, for example, he spied an operator applying filler with a large brush. He noticed that the operator stirred his filler several times during the time he was filling several pieces. Mr. expert immediately picked on this stirring as lost time motion for the operator. He immediately proceeded to rig up something that would cut down this lost motion—so he thought.

The following day there appeared an ice-cream freezer of 5-gallon capacity, which the expert had purchased to put on the job in place of the 5-gallon container with the stick in it to stir the material. This freezer, of course, had a crank that operated paddles inside. By turning it briskly a man could agitate the contents. This worked during the first day, but the following morning it was necessary to spend an hour and a half to get the freezer into condition so that filler could be stirred.

"Efficient" moves of this kind show that by putting confidence in "figure" heads and not depending on the practical men and their possible efficiency, you accomplish nothing but wasting time and throwing money to the winds.

Referring further to this type of efficiency, I have been connected with four concerns, during my time, which have been forced out of business due to being roped into believing that efficiency is in figures only.

The success of any business concern today, I believe, is to first form an organization of capable pivot men; then leave it up to each of these to build the surroundings and make practical operators.—F. W. WORTH.

Use Pressure Regulators On Air Line

ARE THE air lines that serve your finishing room tied in with other air-powered processes in other parts of the factory? Do you have trouble obtaining sufficient pressure at times when the peak load is on elsewhere? Some people have thought that the only answer to this problem would be to provide additional air compressor capacity. However, there is another avenue of approach which will often take care of this. It helps one to make the most of the air power now available in the plant. I refer to the judicious use of pressure-regulating valves.

There are many jobs on air cylinders, vises, chucks, air riveters and other pneumatic equipment which can be done, not only as well but actually better, at considerably less than air-line pressure. Install air pressure-regulating valves on lines where this is found to be the case, and save the difference. One manufacturer of air devices and equipment makes these valves in a piston-type design, to deliver any reduced operating pressure desired, and offers them in different sizes for use on initial pressures as high as 150-lbs.—G. F. K.

Officially Tested and Approved

H. O. M. B.—ES 680 a—CLASS 101

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LUSTRELESS OLIVE DRAB ENAMEL, CLASS 204

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I. C. D. FORMULA NINE

NON-INFLAMMABLE

« *wax free* REMOVER »

for paint, varnish, lacquer, baked enamel, adhesives

EASY TO APPLY—NO AFTER-CLEANING

PROMPT DELIVERIES

I. C. D. FORMULA 9 is the standard of safety and quality . . can be sprayed or brushed . . doesn't raise grain nor discolor . . quickly removes all kinds of finishes and coatings . . costs less to use . . saves time, labor and material.

SPECIALTY COATINGS—I. C. D. Labs. have specialized in the formulation and manufacture of non-inflammable coatings and substitute finishes. If you have a tough coating or finishing problem send in your specifications, finishing schedule and requirements. Immediate action and a prompt reply promised.

INDUSTRIAL CHEMICAL DEVELOPMENT CORP.

Posters Educate Workers

To educate new workers, particularly women, to the significance of the airplane and naval life-saving devices and fire extinguishers they make, and to show them how various parts

Posters help teach workers what they make.

contribute to the finished product, Walter Kidde & Co., compressed gas experts, place simple and graphic posters at prominent points in their New Jersey plants. According to V. J. Hill, Kidde works manager, it was found that employes, both old and new, had no conception of the product they contributed to. Much better results have been obtained since workers know that they are building life-raft inflators or fire-extinguishing systems for PT boats and bombing planes instead of assembling unknown bits and pieces. The posters are changed frequently and when the series is complete it will include an explanation of every product in the Kidde line of war equipment.

Airbrush Bulletin

A new booklet, FM9-42, just released by Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill., describes and illustrates the company's manual airpainting equipment. Airbrushes, extensions, accessories, material containers, airmotored agitators and portable outfits are included in the eight colorful pages, 8½x11-in.

Wet-Dry Surfacing Booklet

A booklet containing 20 illustrated pages 8½x11-in. describes and illustrates methods and equipment for doing a variety of surface smoothing by belt sanding. Wherever production includes smoothing operations, information in this booklet may reveal interesting suggestions and valuable ideas for performing better work more rapidly and at less cost. For a free copy write Porter-Cable Machine Co., Syracuse, N. Y.

New Books

CATALOGS
CIRCULARS
NEWS RELEASES

"Let's Get To Work"

"Hi, Buddy . . . Let's Get To Work for America." This war slogan is being carried into every war production plant that purchases a Gorton Machine Tool (Racine, Wisc.). All Gorton vital war machine tools shipped to war plants within the borders of the United States now prominently display this colorful red, white and blue decalcomania "Emblem of Victory."

Designed to inspire war workers in the plant, the Hi-sign is clearly visible from the first moment the machine

Another red, white and blue Victory decalcomania goes on a Gorton machine completed ahead of schedule, "hi-signing" it as critically needed, ready for non-stop production in America's stepped-up war drive to "Win with Work."

Remember Pearl Essence for

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153 WAVERLY PLACE NEW YORK, N. Y.

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Available in Unlimited Quantities

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arrives, is unpacked and wheeled into production position—and thereafter for the duration. It is a constant reminder, aimed to build morale and develop a feeling of partnership between man, machine and goal.

Hi-signing all plant employes with its friendly greeting, the decals make them conscious of the fact that "Here's another machine tool ready to do its part toward Victory production."

Safe Respirator Booklet

Respirators, gas masks, dust hoods and other safety devices for facial protection in industry are illustrated and described in a conveniently indexed booklet which is ready for free distribution by Pulmosan Safety Equipment Corp., 176 Johnson St., Brooklyn, N. Y. Contents of the booklet include descriptions and illustrations of goggles also. Safety is doubly important in industry during wartime and here is uptodate information about some very essential types of safety devices.

Lighting-Heating Bulletin

"On the Land, on the Sea and in the Air" is the theme of a new 20-page brochure just released by The Fostoria Pressed Steel Corp., Fostoria, Ohio. It illustrates and describes how good lighting and the near infra-red process are speeding the production of war materials used in these phases of warfare—on the land, on the sea and in the air. Copies of this new brochure are available by asking for Flashes No. 1042.

More Workers Buying Bonds

Nearly two million more workers in October pledged part of their earnings for the purchase of War Savings Bonds, bringing the total number of participants in payroll savings plans up to 23,300,000.

Included in this total are nearly 19,000,000 employes in private firms; 2,400,000 workers in Government agencies, and 2,000,000 people in the armed forces of the United States.

During the month, $287,000,000, representing 7.7% of total earnings, was set aside for war bond buying through payroll savings plans. The increasing number of participants in this period is, of course, not yet entirely reflected in total deductions, or in the percentage of earnings which the deductions represent.

Payroll savings plans have now been introduced in firms and Government agencies which employ 28,100,000 people, and more than 75% of this number have already agreed to buy war bonds by this method of systematic saving. These figures do not include payroll savings of members of the armed forces.

A payroll savings drive, initiated on November 16 by the Treasury Department in cooperation with leaders of management and labor, with the slogan "Top That 10% By New Year's," has as its object raising the number of participants in payroll savings plans to 30,000,000 and, as the slogan indicates, to increase deductions authorized for bond buying to better than 10% by the end of the year.

Chrome Painting Replaces Galvanizing

Development of a new technique reducing from 20 hours to five hours the time required for passage of steel plates through the galvanizing process —from entrance to outgoing shipment —was reported today by Hanlon-Gregory Galvanizing Co., Pittsburgh, Penna.

This speeded-up process enabled the company in the past 12 months to pass through its plant 2½ times more tonnage, chiefly plates for the nation's shipyards, than handled in previous years, A. J. Diebold, president, revealed.

The company, he also announced, has this week completed a $145,000 expansion program, including new equipment, which will allow a still greater tonnage increase. One of the new installations, designed in part by the company, will enable the chrome painting of steel plates in half the time previously required.

Mr. Diebold explained that due to shortage of zinc, chrome painting is being substituted for some types of ship plates in order to get quicker production. While chrome painting will not give as durable protection as galvanizing, he commented that it would be ample for its purpose of lasting through the war.

Hilo Varnish Salesmen Hold Convention

Both trade and industrial salesmen of the Hilo Varnish Corp. held a three-day convention recently at the home office, Brooklyn, N. Y. Industrial meetings were conducted by President, Carl J. Schumann and Industrial Sales Manager, Joseph J. Mattiello. Trade sales meetings were conducted by Vice-President, A. G. Schumann and Trade Sales Manager, A. J. Craig. President, Schumann emphasized the importance of concentrating on coatings needed for the war effort and stated that the company's sales were now over 80% direct and indirect war material.

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Write for our War Finishes Specification Folder

YARNALL PAINT COMPANY

Industrial Division

Philadelphia Penna.

Industrial FINISHING

Distributed monthly to finishing room and paint shop foremen, production superintendents and company officials of metalworking, woodworking and miscellaneous industrial plants where production finishing is a major operation in parts and products manufacture.

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Editorial

Wartime Painting Achievements

The January issue of INDUSTRIAL FINISHING for 1943 will be appropriately designated as the "Wartime Painting Achievements" number. This timely subject will be the dominating theme of the entire editorial contents. A review of new and improved finishing materials, plus forecasts for the future, will be included as usual, but it will all have a definitely wartime atmosphere.

Accomplishments in the vast realm of protective, camouflage and identification coatings for use on war products, have been tremendous. These will be reviewed along with an interesting and informative presentation of many newly developed materials for both wartime and civilian uses. Many illustrations of war production painting will be shown.

The January issue, like every one published by Practical Publications, Inc., will be valuable for immediate reading and for future reference. Recognizing this fact, the purchasing agent at a large ordnance plant had typed prominately on his company's subscription order, the following notation:

"Reason: To help keep the foreman and superintendent of the paint department up with the latest changes and developments in painting and finishing parts."

Substitute Materials and Wartime Difficulties

★ Substitutions are taxing the ingenuity of both manufacturers and users of finishing materials. I will venture the statement here that more has been learned in the past nine months about the production

★ Guest Editorial . . . Many readers can write an excellent editorial — two or three paragraphs that present a timely suggestion or valuable idea which will stimulate real thought on a live subject. The Editor welcomes guest editorials and pays for those that are published.

★ ★ ★ **INDUSTRIAL FINISHING wishes all of its friends a Merry Christmas and a very Happy Victorious New Year.**

finishing of plywood for outdoor exposure than was accumulated in the 20 years before Pearl Harbor. Almost daily, problems are being handed to finishing material manufacturers, and are being solved by them—problems which, a short time ago, would have been waved aside as impossible, or at least declared impracticable.

There is a noticeable spreading of something like the spirit of the naval engineer in charge of the greatest marine salvage operation the world has ever seen, now in progress, who when queried on how long it would take, replied: "It's hard to say. The difficult jobs we do at once. The impossible ones take a little longer."

Finish manufacturers "cut to the bone" on raw materials, bound and restricted by rigid specifications, are asked for durable, tough, one-coat finishes for bare stainless steel and anodized aluminum; for adhesives to bond all manner of things to such surfaces; wood finishes to resist indefinitely complete immersion in aromatic aviation fuel, or quick-drying interior finishes for wood water tanks "which will not taste the water". Yes, the impossible jobs take a little longer, but the solutions that are being reached on such problems are a tribute to American ingenuity.

Curtailment of cellulose products for furniture finishing is bringing to light a drastic revision in methods and materials. Not the least among these is the promised return to natural-gum varnishes—without shellac as a sealer.

This automatically portends a return to a longer drying time, further investigations into the matter of forced drying, less easy sanding and softer films, requiring more careful rubbing. All this may, we hope, lead logically into some of the almost forgotten advantages of the "good old days"; for example, the one coat a day rule; heeding the adage that "two thin coats are better than one heavy coat"; or the old quality standard of "put on six coats and rub off four."

Not all of this to the letter, perhaps, but surely we will regain, with the return to some discarded materials and methods, some of the attendant, and also perhaps almost discarded, belief that there are just two kinds of work—good and bad. The ever present prowling inspectors now with us may well serve to re-educate us to the commendable practice of producing one kind only—the best we can.

There is a cloud of haste, pressure and nervous tension over all our efforts today, but I prefer to believe that it has a silver lining. "It's an ill wind . . .".—S. T. W.

Experiences With Wartime Help

* The exasperations of trying to produce in the face of the present labor turnover, scarcity of materials, and rigidity of specification

requirements may be tempered, in a measure, by the fact that this emergency industrial situation has it's brighter side.

Many foremen and production superintendents are being called upon today to produce more and more with less abundant and less skilled labor. An almost universal cry is that available personnel is unskilled in the work required of it. This in itself may offer an almost unprecedented opportunity for the wide-awake conscientious supervisor.

Some years ago we knew a foreman who had a peculiarly difficult spraying problem. An intricately shaped die-cast part had to be spray-coated with a special texture finishing material. The coating had to be applied evenly and in just a certain quantity to achieve the desired result. One spray man botched the job in his own particular way, and another puttered at it until the foreman was literally tearing his hair. Later we looked in to find the job running smoothly, rolling along without a hitch. We queried the foreman on how it was done. "Oh", he replied, "I just hired a kid who never saw a spray gun before and showed him how I wanted it done."

There is a world of sagacious managerial psychology in that simple statement. In every finishing room there are sincere industrious men who have had much practical experience, but much of it of a relatively narrow scope. To be facetious, "You can always tell them, but you can't tell them much." They have much to "unlearn" to adapt themselves quickly and efficiently to emergency conditions. Make no mistake. There are many alert, intelligent, versatile men who can adapt themselves readily and who have mastered the primary essential lesson—an appreciation of their own limitations and the fact that there is always something to be learned, even about one's own job. It is the ever present hard-shelled "old timer" type who can put a thorn in the flesh of the harrassed foreman of a war production shop.

In training these new workers the supervisor has an opportunity to put into practice the fruits of his own experience and observation, and to have the job done the way he would do it if he were to do it himself.—W. T. SMITH.

Many Big Troubles Are Due to Little Things

In all of this hurried activity, working around the clock to get out more war products, and with many new people in the war-production factories, some little but very essential things are being neglected in connection with the use of coating materials. That is, certain little things are being overlooked or slighted in some plants, and it is causing needless waste and unsatisfactory results. Experts are being called in to solve these difficulties which could be quickly and effectively eliminated by simply following correct procedure

A few of the suggestions are so simple and elementary that one hesitates to put them in print. For example, take mixing, or rather stirring the paint contents of a drum or other container to get all solids that may be settled heavy on the bottom, mixed thoroughly with the liquid, so that your contents will be of the same consistency throughout. You have seen

brush painters do this. They know better than to use paint that is thin at the top and heavy at the bottom.

Probably, you have mechanical equipment for doing the job more thoroughly and quickly than the painter who merely uses a paint paddle. Use your stirring or agitating equipment, and use it properly. Stirring or agitating the contents of paint containers is tremendously important. It should be a routine job. If thinner is added, stir it in properly and thoroughly, and agitate the contents long enough to make the consistency of the material uniform throughout. Then test the paint with a viscosity cup, keeping uniform the viscosity that has proved to be best for your work. Also, be sure to maintain uniform temperature during these tests and during production.

Another thing that should follow immediately, but one frequently omitted, is to strain the material—this to further help make it uniform. You will be surprised at what the strainer will catch from what is supposed to be clean paint, clean thinner and a clean container. What the strainer catches would almost surely cause considerable trouble later, during the process of applying the paint to the surface of products.

Several more important little things could be enumerated. They are well known to every experienced finisher and finishing foreman. If you have one or more of these experienced men in your organization—and if they are competent—give them more responsibility, more authority and perhaps more pay. Their knowledge, applied to solving paint problems, can save your company much that is now being wasted.

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Adaptation of formulae to the individual requirements of busy war contractors.

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Within specification limits there are many possibilities of improvement in speed, workability, and freedom from rejects.

This PLUS factor is worth considering. We'd like to tell you more about it.

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CLEVELAND, OHIO

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"WARTIME PAINTING ACHIEVEMENTS"

Edition for January, 1943

THE JANUARY 1943 issue of INDUSTRIAL FINISHING magazine will be a "Wartime Painting Achievements!" number, featuring factual information on paints and miscellaneous finishes developed for the purpose of coating ordnance and munitions items.

This is the regular January Annual Forecast and Review Edition (so titled in past years), now geared to cover wartime activities in production finishing. So new and exacting, yet ever changing to meet rigid Government specifications, the coating of defense and war items for the purpose of protection, concealment and identification, presents many tough production finishing problems.

Covering the subject in a thorough and authoritative manner, this "Wartime Painting Achievements!" issue should be in the hands of company executives, production superintendents, paint shop and finishing foremen. Manufacturers of paints, finishing materials and equipment should use advertising space in it, too!

Make Immediate Reservations for your Copy! . . Advertising rates on request.

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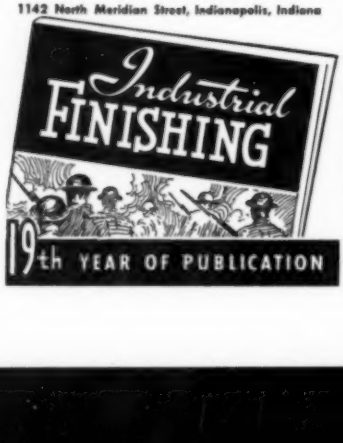

Questions; Answers

Questions are welcome and will be answered promptly by mail. Readers are invited to prepare and send in additional information relating to any of these questions and answers.

Wood Springs for Furniture

One of our foremen, Mr. C. Young, who has been a subscriber to your magazine for some time, has advised us to write you with the possibility that you may be able to give us the information we require. We understand that during the Furniture Exhibition in Chicago, a spring made of wood was shown which would take the place of steel coil springs in upholstered furniture. Any information that you could give us as to where this type of spring could be purchased would be much appreciated.—J. T. Co.

In cooperation with the School of design in Chicago, we have been making an effort to develop a suitable wood substitute for upholstering springs, and while many forms have been produced we are not prepared to offer any one of them at this time. You will appreciate that to simulate the action of a coil spring in wood is a difficult matter. Obviating the danger of breakage, as well as fatigue, requires more thorough consideration. —THE SENG CO., Chicago, Ill.

We regret to advise that we have not prepared any literature or il-

lustrations of our spring. However, the "Bedding Manufacturer" took some photographs at the Chicago market, and are preparing some articles. As soon as they arrive, we will be glad to send you a copy of same and complete information.—GREGORY MFG. CO., Brazil, Ind.

Several other manufacturers are working on or have developed wood springs, among them being Heywood-Wakefield Co., Gardner, Mass.; Strand Ski Co., New Richmond, Wisc.—ED.

Facts for Finishers

DID you know that . . . . The most familiar example of infra-red rays are those which transfer the heat generated at the sun across 93,000,000 miles of emp*ty space to envelop the earth and* keep us warm.

* *

You can aid in the United Nations' War effort by not wasting finishing materials and solvents.

* *

There are a great number of distinguishable shades of white. Whites may be pinkish, bluish, yellowish, etc., and all combinations in between. To the average person, a bluish white finish is considered whitest.

* *

Taking an average price for a bottle of nail lacquer, it has been calculated that women pay for this beautifying material at the rate of $38.40 per gallon. [A costly luxury and no man admires the finished effect.]

* *

Finishing materials play an important part in our war efforts in camouflage, protection of equipment, buildings, etc.,—and identification of products.

* *

White lead, the white pigment best known for its use in architectural paints, bears the imposing chemical name "basic lead carbonate" and has the majestic formula $Pb^3(OH)^2(CO_3)^2$.

* *

Finely-divided aluminum is not the only metallic pigment used in

For interior and exterior painting of surfaces beyond ordinary reach.

CROWN
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Used in many war plants for truss work, girders, roof work.

This self-contained unit costs less and has all the features of the best production guns including full trigger control.

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finishing materials. Copper, tin, zinc, bronze, etc., have also been used where their protective or decorative characteristics were of value.

* *

Solvents derived from petroleum were once not popular with manufacturers and users of finishing materials. They were considered cheap and inferior. Today, however, petroleum solvents are widely used and are obtainable in wide variety and of excellent uniformity.

* *

One of the largest uses of organic finishing materials is in the decorating of fabrics. Curtains, tablecloths, many of milady's dresses, and countless other items are made from cloths printed in attractive designs with organic finishing materials.

* *

In an investigation of fires in ovens, it was found that the greatest single cause was overheating. It is good insurance to check the operation of baking ovens frequently.

* *

Common ordinary vinegar (week acetic acid) used to wash down galvanized iron will greatly aid adhesion. After swabbing the gal-

Blanchit
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WOOD BLEACH
Improved to Intensify Action.
Saves Time and Labor.
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NOROY SPECIAL-LAC
Surprised Every One Who Tried It!
The industry's immediate acceptance of NOROY SPECIAL-LAC was gratifying and the volume of new business and repeat orders was amazing! It usually takes a little while to get into high but NOROY SPECIAL-LAC got there over night.
It is a perfect successor to pure shellac. Has identical appearance—color—body—reduction—drying time, and is completely **waterproof.**
ORDER 5 GALLONS AT DRUM PRICE
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vanizing with the acid, rinse it off with fresh water and dry thoroughly before applying the finishing material.

* *

The specific gravity of a finishing material and its viscosity have no particular relationship. For example, the specific gravity of a lacquer or paint, etc., changes but little with a change in temperature but the viscosity may change appreciably.

* *

There are literally thousands of uses for organic finishing materials. Such widely varying items as brooms and battleships, pipes and picture frames, and tacks and trumpets use finishing materials for protection or decoration or both.

Wood Lacquer, Wood Dust Paste

WASTE not! Save your lacquer drippings and the sticks you have used for stirring clear lacquer. Place them in a suitable quantity of lacquer thinner until you have a heavy solution. (Lacquer for use on wood is best). Then take the dust that you get from an electric sander; wet this dust or wood flour with thinner, and stir it in the wood lacquer that you have reclaimed. The result is a heavy paste.

This paste can be used to fill cracks in wood. You can also thin the paste and make a knifing wood filler which will dry in a very short time. It will not shrink, and when dry it can be sanded. It can also be used as a stipple paste. In fact, it can be used to produce raised decorative effects on picture frames, boxes, book ends, etc.—for instance by use of a funnel or caulking gun, in much the same way as putting decorative icing on cakes.

I have mahogany wood flour paste and maple wood flour paste, some of which is a year old, and I am still using it.

Wood can be filled, sealed, sanded and coated with clear lacquer all on the same day. I have not had the slightest difficulty in using this material over a period of 12 or 14 months, and hope that the suggestions will be helpful to others.—E. M. S.

SAVE 50% ON STAINS
Mix your own liquid stains from Campbell Dry Stains. We have a type suitable for any purpose. 2 to 5 oz. makes a gallon. Any stain on market easily duplicated. To prove it, send us sample of stain you are using. We'll show you how to make it—at a big saving.
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LACQUERS SYNTHETICS VARNISHES

Dehumidifying the Finishing Room

EXCESSIVE humidity is ruinous to some finishing processes, and for this reason the finishing room is often better fitted to do really good work when equipment for dehumidification has been installed. In most cases, those finishing processes where humidity is especially harmful may be separated and enclosed in a small room by themselves, thus obviating the necessity for using extensive equipment. Small units are available which will serve spaces up to 2000-cu.ft. The only electrical connection that is necessary is to plug them into a light socket. A small fan circulates dry clean air into the space to be conditioned, and gives quick results. The cabinet is only 26-in. high, and barely over 12-in. square.

Branding in Plastic

BRANDING operations are not new. There are many cases where brands may be used to better advantage than engraving, particularly with reference to articles of wood and other materials that are relatively easy to indent. When we come to the branding of plastic molded parts, and that by means of a process that permits the fusing of contrasting colors permanently into the impressions, we have something that is new, something that lends great distinction to the product to which the branding is applied. Equipment for doing this work is not on the market, so far as I know, but there is a firm in Chicago that does this work on contract, on plastic parts shipped to them for this purpose. —R. T. O.

AS of today, in more than 20,000 firms of all sizes have reached the "Honor Roll" goal of at least 10% of the gross payroll in War Bonds. This is a glorious testimony to the voluntary American way of facing emergencies.

But there is still more to be done. By January 1st, 1943, the Treasury hopes to raise the present total of 20,000,000 employees investing an average of 8% of earnings to 30,000,000 investing at least 10% of earnings in War Bonds.

You are urged to set your own sights accordingly and to do all in your power to start the new year on the Roll of Honor appearing in the "Payroll Savings News." For copy write War Savings Staff, Treasury Department, Washington, D. C.

TIME IS SHORT. Our country is counting on you to

"TOP THAT 10% BY NEW YEAR'S"

Save with

War Savings Bonds

This space is a contribution to America's All-Out War Effort by
INDUSTRIAL FINISHING

A Salute to the Marines

THERE'S NO TIME TO LOSE—THERE'S JUST TIME TO WIN!

INSTRUMENT BOXES
AIRPLANES
GUN STOCKS
BOMB SIGHT BOXES
TOOL CHESTS
MARINE PARTITIONS
RADIO INDUSTRY, ETC.
SKIIS

MAJOR GENERAL ALEXANDER VANDERGRIFT, U. S. M. C., and his gallant Marines on Guadalcanal have written a brilliant page in the history of the U. S. Marine Corps. The Devil Dogs have broken records for continuous action under fire and have proven themselves and their equipment superior to the enemy's. Their individual heroes are legion and every Marine has lived up to the fine traditions of the Corps.

To those of us who must remain at home on the production front, it is heartening to know that our men and equipment are tipping the balance of the global war in our favor.

Our production facilities are devoted to the manufacture of government specification protective coatings. Listed here are just a few of the war products now being coated with our materials.

Phone, wire or write and let one of our finishing experts help you "keep production rolling."

THE LAWRENCE-McFADDEN CO.

Headquarters for Fine Finishes Since 1875

7430 STATE ROAD PHILADELPHIA, PA.

Rotary Power Brush Scrubs Large Areas

LARGE metal surfaces are often encountered these days. Swift and thorough removal of scale, rust, etc., from products too large to put into a pickling bath, is an important operation. It must be accomplished in one way or another before painting. A big, husky cup brush of the rotary scrubbing type, when properly powered, does this job to perfection. In addition, it removes a great deal of slag from welded seams. One such tool, developed by one of the brush manufacturers, has a double row of wires, held by a knot-type anchor. It will fit most of tthe standard portable power tools. Shipyards are using these brushes extensively for cleaning new hulls before painting. No better proof of their effective performance could be asked.—S. N. J.

"Metalizing" Wood Caskets

SINCE metal is out for the duration, in the casket industry, I thought someone might be interested in a process I have worked out for "metalizing" wood. Other finishes can also be applied over the same surface if desired.

First of all, the wood to be finished should be dried to the point where it doesn't contain more than

10% moisture. This is important because if any finish is applied on wood containing too much moisture, the finish is sure to go bad in a very short time, due to excessive expansion and contraction of the wood under the finish coats.

Next, putty all nail holes, imperfections and identifications with a good water putty. After the putty is dry, usually in one hour, sand the surface smooth with a felt sand block and No. 5/0 sandpaper. Also, sand any rough spots and end wood to a smooth surface at the same time you are sanding the puttied places. Dust off the wood, preferably with compressed air, and be sure that the dust is blown out of all crevices and low places.

Spray on one coat of synthetic surfacer, being sure to get all of the surface completely covered with a good wet coat. Let this coat dry for about two hours at room temperature, or force dry for 30 minutes at 125° F. When cool, sand the surface lightly with No. 6/0 sandpaper. The first coat of surfacer will cause nibs and fuzz on the wood, but the light sanding, with No. 6/0 sandpaper will knock these off and make a smoother surface for the final sanding of the second coat.

Apply a second coat of surfacer, being sure to spray on a good wet coat evenly over all the surface. This is important because if you have thin places on the surface you will sand through to the wood during the sanding operation. This must not happen, for wherever lacquer touches the base wood it will raise the grain.

Let the second coat of surfacer dry over night at a room temperature of 70° F. and sand to a smooth surface with No. 5/0 sandpaper, using a felt sand block wherever

HELP YOUR SPRAY MEN MAINTAIN SCHEDULES

with this newly designed Respirator

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- LIGHTER WEIGHT
- HIGH SAFETY

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M3C CHEMICAL RESPIRATOR

Many exclusive features provide lightness, comfort, easy breathing. Low in cost, very serviceable. Write for details and prices. Pulmosan Safety Equip. Corp., Dept. IF, 176 Johnson St., Brooklyn, N. Y.

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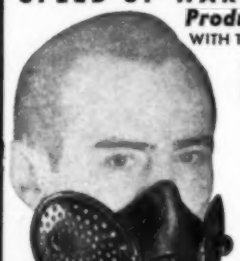

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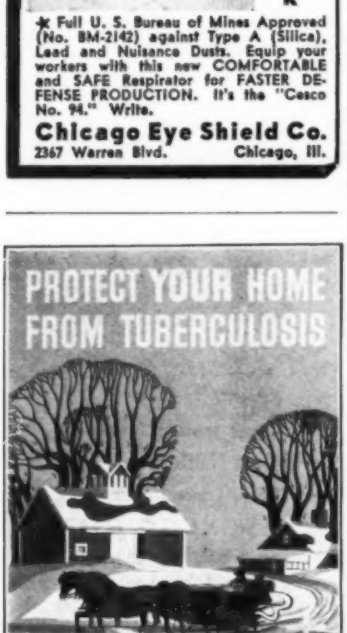

possible. If the sanding is done thoroughly and carefully, you should have a perfectly smooth surface with no wood grain showing.

From here on, you can follow the same procedure as you would in finishing metal caskets. You can put on one coat of lacquer primer and sand lightly with No. 8/0 sandpaper, when thoroughly dry; and then go on with the color, shading and blending, and finally the top coats. Or, if you prefer, you can put the color right on the surface. From my experience, I find that by using one coat of lacquer primer I get a much better finish.

The degree of perfection obtained depends almost entirely on the type of surfacer used and the way it is applied and sanded.

This treatment is good on willow, birch and poplar. It can also be used on oak in the same manner, providing the pores of the wood have been filled with a good natural filler.—C. NAGAMOR.

Finishing Aircraft Plywood

AIRCRAFT plywood finishing systems must be designed to meet extremely severe conditions. Generally speaking, the manufacturer prepares his panels with a 7% to 12% limit of moisture content, which is permitted under approved requirements. Effective finishes must keep out higher percentages of moisture while the plywood is in transit, while it is in stock or being fabricated, and finally when the finished plane is in flight.

Since planes must operate in the arctic, over the desert and in the stratosphere, the magnitude of the

problems of plywood finishing for this purpose is apparent. As an illustration of the severity of the tests, here is a typical specification which plywood for aircraft must meet:

"Desert temperature of 150° F. for six hours, followed by sub-zero stratosphere temperature within a space of 15 minutes, held for one hour, then back to desert conditions at 150° F.

Another reads:

"Tropcial temperature of 110° F. with relative humidity of 90% for six hours, followed by sub-zero stratosphere temperature within a space of 15 minutes, held for one hour, then returned to tropical conditions of 110° F. at 90% relative humidity."

The method of application is limited by the production procedure and available equipment. The systems developed by one manufacturer of protective coatings involve several operations, depending upon the nature of the wood used in fabricating the panels. A typical system might employ a clear sealer, a filler (on open grained wood only), a pigmented sealer and finally a camouflage enamel. The problem of camouflage materials alone has been a primary development project for all types of protective coatings used in the war production program.—A. & W.

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